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OPERATIONS & SERVICE MANUAL
Manual 20-36
Revised 9/15/07

ITW Dynatec

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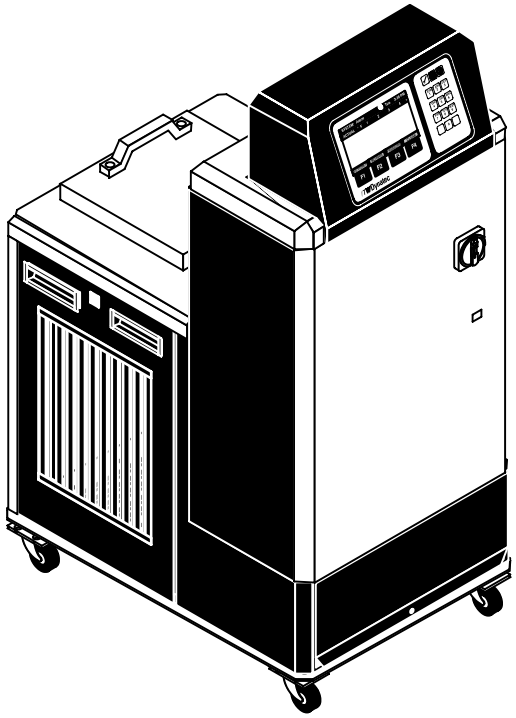
DYNAMELT® M SERIES ADHESIVE SUPPLY UNIT OPERATIONS AND SERVICE MANUAL

Model DM M35 DCL

Software V5.11M and up with Expanded DynaControl



For an online copy of this manual, go to www.itwdynatec.com/manuals.htm

IMPORTANT ! - READ ALL INSTRUCTIONS BEFORE OPERATING THIS EQUIPMENT

It is the customer's responsibility to have all operators and service personnel read and understand this information. Contact your ITW Dynatec customer service representative for additional copies.

NOTICE! Please be sure to include the serial number of your application system each time you order replacement parts and/or supplies. This will enable us to send you the correct items that you need.

ITW Dynatec Service Parts Direct Dial: 1-800-538-9540
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Moving Forward Through Technology ™

TABLE OF CONTENTS

Chapter 1 Safety Precautions — Chapter - Page #

Electrical . . . 1-1
High Temperatures . . . 1-1
High Pressure . . . 1-1
Protective Covers . . . 1-1
Eye Protection & Protective Clothing . . . 1-2
Safe Installation and Operation . . . 1-2
Treatment for Burns From Hot Melt Adhesives . . . 1-2
Service . . . 1-3
Explosion/ Fire Hazard . . . 1-3
Lockout/ Tagout . . . 1-3

Chapter 2 Description & Specifications

Description . . . 2-1
Specifications . . . 2-2
Installation Dimensions . . . 2-4
Total System Wattage Capacity . . . 2-5
Main Circuit Breaker Determination . . . 2-5
Definition of ASU Code . . . 2-6

Chapter 3 Installation & Start Up

Placing the DYNAMELT ASU . . . 3-1
To Open/ Close Panel Box Door . . . 3-2
Installation . . . 3-2
User Connections . . . 3-3
Printed Circuit Board Location Diagram . . . 3-4
Hose/ Head Electrical & Adhesive Connections (illustration) . . . 3-6
Electrical Connections & Filter Manifold Arrangement, Maximum Hose/ Head Configuration (illus.) . 3-6
Adding Adhesive . . . 3-7
Changing the Adhesive Formula . . . 3-7
Field Installation of Controller Options . . . 3-7
Adjusting the Pressure Relief Valve . . . 3-8
Pump Enable (Ready) Thermostat Calibration . . . 3-10
Calibration of the Optional Voltage Tachometer . . . 3-11
Installation of the Optional Tach Generator or DC Tracking Signal . . . 3-12
Calibration of the Optional Tach Generator or DC Tracking Signal . . . 3-13
Level Control, Capacitive, Sensor with Amp . . . 3-14
Typical Start Up and Shut Down Procedures . . . 3-15
Storage and Disposal of the Application System . . . 3-16

Chapter 4 DynaControl Controller Set-Up

Temperature Control Functions in General . . . 4-1
Defining DynaControl Temperature Control Terms . . . 4-1
Error Indication and Alarms . . . 4-4
Optional System Status Lights . . . 4-6
Settings for a Typical Operation . . . 4-6
System Values that are Factory Programmed (not customer accessible) . . . 4-7
Customer Programmable Values Preset at the Factory . . . 4-7

Default Settings of the DynaControl Controller 4-8
Helpful Tips for the User 4-9
Serial Protocol 4-10
EtherNet/IP Adapter Option 4-13

Chapter 5 Programming of DynaControl Controller

Controller Safety Consideration 5-1
Software Version 5-1
Display & Keypad Reference 5-2
Basic Programming Sequence: Quick Reference 5-4
Controller Setup 5-5
    Turning the Controller On 5-5
    Language Selection 5-5
    Temperature Scale Selection 5-5
Actual Temperatures Screen 5-6
Use of the Actual Temperatures Screen 5-6
    Programming Sequence 5-7
    Monitoring 5-7
Setpoints Programming Screen 5-8
Use of the Setpoints Programming Screen 5-9
    Programming 5-9
    Monitoring 5-9
Motor Programming Screen 5-10
Use of the Motor Programming Screen 5-11
    Programming 5-11
    Monitoring 5-11
Optional Clutch Programming Screen 5-12
Use of the Optional Clutch Programming Screen 5-13
    Programming 5-13
    Monitoring 5-13
Optional Pressure (PSI/BAR) Programming Screen 5-13
Use of the Optional Pressure (PSI/BAR) Programming Screen 5-15
    Programming 5-15
    Monitoring 5-15
Service Functions Screens 5-16
Service Page 1 5-16
    High/ Low Temperature Deviation 5-17
    Standby Temperature 5-17
    Standby/ Sleep Setup 5-17
    Setpoint Limitation 5-17
    Temperature Offset 5-18
    Sequential Heating 5-18
    Temperature Scale 5-18
    Change Security Lock 5-18
Service Page 2 5-19
    Customer Zone Names 5-19
    Power On Configuration 5-19
    Factory Defaults 5-20
    Keypad Locking 5-20
    PC Link 5-20
    Language 5-20

LCD Contrast 5-20
System Logbook 5-20
Change Security Lock 5-20
Service Page 3 5-21
Programming at Main Scheduler Screen 5-22
Use of the Main Scheduler Screen 5-23
Programming of 7-Day Scheduler 5-24
Use of the 7-Day Scheduler Screen 5-25
Programming 5-25
Up/ Downloading Instructions: Controller to Remote PC (PC Link) 5-26

Chapter 6 Preventive Maintenence

General Cleaning 6-1
Preventive Maintenance Schedule 6-1
Outlet Filter 6-1
Outlet Filter Manifold (illustration) 6-2
Hose Fittings 6-3
Fasteners 6-3
Filter Shutoff Cleaning or Replacement 6-3
Pump Shaft Leak 6-4
Summary of Preventive Manintenance Schedule 6-4
Flushing the System 6-5

Chapter 7 Troubleshooting

General Troubleshooting Notes 7-1
Preliminary Checks 7-1
Error Messages 7-1
Hose/ Applicator Troubleshooting Tip 7-1
Motor Speed Control PC Board Re-set 7-1
High-Temperature Redundant Overtemp Thermostat 7-2
Pump Enable Thermostat 7-2
Lithium Battery on PC Boards 7-2
Handling Printed Circuit Boards 7-3
CPU Printed Circuit Board & Layout Illustration 7-4
Display CPU Printed Circuit Board & Layout Illustration 7-5
Motor Control Interface Printed Circuit Board & Layout Illustration 7-6
Motor Speed Control Printed Circuit Board & Layout Illustration 7-7
48-Zone Power Printed Circuit Board & Layout Illustration 7-9
Optional Clutch Printed Circuit Board & Layout Illustration 7-10
Optional RS232/485 Printed Circuit Board & Layout Illustration 7-10
Optional Pressure (PSI) Printed Circuit Board & Layout Illustration 7-11
Heater and Sensor Resistance Values 7-12
Resistance Tables 7-13
Error Indication Alarm Troubleshooting Guide 7-14
Adjustable Adhesive Pressure Relief Valve 7-22
Operation of the ASU's Gear Pump 7-23
Troubleshooting the ASU Pump 7-24
Gear Pump Troubleshooting Guide 7-25

Chapter 8 Disassembly & Re-assembly Procedures

Disassembly Procedures 8-1
To Remove the Access Doors 8-1
To Open the Junction Box 8-1
Sensor or Thermostat Replacement 8-2
To Remove the Manifold Cover 8-2
Heater Replacement 8-2
To Access the RTD Sensor in the Optional Drop-in Grid 8-2
To Access the Electrical Components Inside the Panel Box 8-3
Fuse Replacement 8-3
Printed Circuit Board Replacement 8-3
To Access the Pump or Motor 8-4
Motor Removal 8-4
Pump Removal 8-5
Pump Seal (O-ring) Replacement 8-5
Re-assembly Procedures & Cautions 8-5

Chapter 9 Available Options & Accessories

Pressure Gauge Kit 9-1
Pre-PSI and Post-PSI Transducers 9-1
Drop-in Grids 9-1
High Temperature Heater Groups 9-1
Filter Options & Accessories 9-1
Level Control 9-1
Pump Options & Accessories 9-2
Gear Motor Options 9-2
Return (Re-circulating) Hoses 9-3
Electric Clutch Kit 9-3
DynaControl Options 9-3
Recommended Service Parts List 9-5

Chapter 10 Component Illustrations & Bills of Material

Chapter Format 10-1
Pressure Relief & High Temperature FIlter Block Assembly 10-2
Typical Electrical Panel Box Assembly 10-4
Cabinet Assembly 10-8
Drive Assemblies 10-10
Melt & Grid Assemblies 10-12
Gear Pumps 10-14
Pump Adapter Assemblies 10-22
Pressure Gauge Kit 10-24

In addition to the assemblies listed above, this chapter may also contain illustrations for other optional assemblies ordered with your ASU.

Chapter 11 System Schematics & Engineering Drawings

Hose Schematic: all models 11-2
Head Schematic: all models 11-3
Flow Diagram, Outlet Filter Manifold/ Cross Channel 11-4
Typical Hydraulic Schematic 11-5
Optional System Status Lights 11-5
Optional Level Control 11-6
Optional Electric Clutch 11-7
Grounding Diagram 11-8
Power Wiring Diagram, 240v 11-9
Signal Wiring Diagram, 4Hose/4 Head, 240v 11-10
Power Wiring Diagram, 380v 11-12
Instruction Sheet for Pump & Zone Configuration 11-13
Special Dynamelt M ASU Schematics . . . . . end of chapter

Appendix

Optional Dynatec/ Zenith Standard Accuracy Gear Pumps . . . . . Appendix 1
Optional Dynatec/ Zenith High Accuracy Gear Pumps . . . . . Appendix 15
Optional Zenith Melt Spinning Pumps . . . . . Appendix 28
High Accuracy Pump Performance Chart . . . . . Appendix 34
Pressure Transducer . . . . . Appendix 35
Electric Clutch . . . . . Appendix 37
Optional TSHA Pumps . . . . . Appendix 39

Chapter 1
SAFETY PRECAUTIONS

All operators and service personnel must read and understand this manual before operating or servicing equipment.

All maintenance and service on this equipment must be performed by trained technicians.

Electrical

Dangerous voltages exist at several points in this equipment. To avoid personal injury, do not touch exposed connections and components while input power is on. Disconnect, lockout and tag external electrical power before removing protective panels.

A secure connection to a reliable earth ground is essential for safe operation.

A disconnect switch with lockout capability must be provided in the line ahead of the unit. Wiring used to supply electrical power should be installed by a qualified electrician.

High Temperatures

Severe burns can occur if unprotected skin comes in contact with molten adhesive or hot application system parts.

Safety glasses, gloves and long- sleeved clothing must be worn whenever working with or around adhesive application systems.

High Pressure

To avoid personal injury, do not operate the equipment without all covers, panels and safety guards properly installed.

To prevent serious injury from molten adhesive under pressure when servicing the equipment, disengage the pumps and relieve the adhesive system's hydraulic pressure (e.g., trigger the heads, hand-held applicators, and/or other application devices into a waste container) before opening any hydraulic fittings or connections.

IMPORTANT NOTE: Even when a system's pressure gauge reads "0" psig, residual pressure and trapped air can remain within it causing hot adhesive and pressure to escape without warning when a filter cap or a hose or hydraulic connection is loosened or removed. For this reason, always wear eye protection and protective clothing.

Either of the two High Pressure symbols shown may be used on equipment.

Protective Covers

Keep all guards in place!

To avoid personal injury, do not operate the application system without all covers, panels and safety guards properly installed.

Eye Protection & Protective Clothing

It is very important that you PROTECT YOUR EYES when working around hot melt adhesive equipment!

Wear safety glasses with side shields which conform to ANSI Z87.1 or EN166.

Failure to wear safety glasses could result in severe eye injury.

It is important to protect yourself from potential burns when working around hot melt adhesive equipment.

Wear protective gloves and long-sleeved, protective clothing to prevent burns that could result from contact with hot material or hot components.

Always wear steel-reinforced safety shoes.

Safe Installation and Operation

To avoid possible failure of hoses, make sure all hoses are routed to avoid kinking, tight radius turns (8” or less) and abrasive contact. Hot-melt hoses should not have prolonged contact with heat-absorbing surfaces such as cold floors or metal troughs. These heat-absorbing surfaces can alter adhesive flow and cause incorrect calibration. Hoses should never be covered with materials that prevent heat dissipation, such as insulation or sheathing.

Read this manual before applying electrical power to the equipment. Equipment may be damaged by incorrect electrical connections.

Do not use adhesive that is dirty or that may be chemically contaminated. Doing so can cause system clogging and pump damage.

When adhesive hand-held applicators or other movable applicators are used, never point them at yourself or at any other person. Never leave a hand-held applicator’s trigger unlocked when not actually in use.

Do not operate the hopper or other system components without adhesive for more than 15 minutes if the temperature is 150 degrees C (300 degrees F) or more. To do so will cause charring of the residual adhesive.

Never activate the heads, hand-held applicators and/ or other application devices until the adhesive’s temperature is within the operating range. Severe damage could result to internal parts and seals.

Treatment for Burns From Hot Melt Adhesives

Burns caused by hot melt adhesive must be treated at a burn center.

Care should be used when working with hot melt adhesives in the molten state. Because they rapidly solidify, they present a unique hazard.
Even when first solidified, they are still hot and can cause severe burns. When working near a hot melt application system, always wear safety gloves, safety glasses and long-sleeved, protective clothing.

Always have first-aid information and supplies available.

Call a physician and/or an emergency medical technician immediately.

Service

Refer all servicing to qualified personnel only.

Explosion/ Fire Hazard

Never operate this unit in an explosive environment.

Use cleaning compounds recommended by ITW Dynatec or your adhesive supplier only. Flash points of cleaning compounds vary according to their composition, so consult with your supplier to determine the maximum heating temperatures and safety precautions.

Lockout/ Tagout

Follow OSHA 1910.147 (Lockout/ Tagout Regulation) for equipment's lockout procedures and other important lockout/ tagout guidelines.

Be familiar with all lockout sources on the equipment.

Even after the equipment has been locked out, there may be stored energy in the application system, particularly in the capacitors within the panel box. To ensure that all stored energy is relieved, wait at least one minute before servicing electrical capacitors.

Use of PUR (Polyurethane) Adhesives

PUR adhesives emit fumes (MDI and TDI) that can be dangerous to anyone exposed to them. These fumes cannot be detected by the sense of smell. ITW Dynatec strongly recommends that an exhaust hood or system be installed over any PUR system.

Consult with your adhesive manufacturer for specifics about required ventilation.

CAUTION: Because of the nature of PUR adhesives to strongly bond in the presence of moisture, care must be taken to prevent them from curing inside Dynatec equipment. If PUR adhesive solidifies in a unit, the unit must be replaced. Always purge old PUR adhesive from the system per your adhesive manufacturer's instructions and timetable. ALLOWING PUR ADHESIVE TO CURE IN A UNIT VOIDS ITW DYNATEC'S WARRANTY.

In This Manual

WARNINGS and CAUTIONS are found throughout this manual.

WARNINGS mean that failure to observe the specific instructions may cause injury to personnel.

CAUTIONS mean that failure to observe the specific instructions may damage the equipment.

Chapter 2
DESCRIPTION AND SPECIFICATIONS

Description

The DYNAMELT® M Series adhesive supply units (ASU) are computer-controlled hot-melt supply units designed on metric standards. Their control panels, with choice of display languages, provide comparative data of all setpoints, motors, etc. on a few convenient, comprehensive display screens.

The Dynamelt M Series ASUs are available in three cabinet sizes and offer four hopper sizes. The Dynamelt M 35 uses a microprocessor temperature control to closely control the temperature of hot-melt adhesive for up to 4 hoses and 4 heads. Temperature setpoints are operator-selected for up to 16 zones and the system automatically provides warnings and alarms for operator errors and system malfunctions.

The Dynamelt/ DynaControl system provides accurate, proportionate temperature control for the hopper, hoses and applicators. Sequential heating delays may be programmed for turn-on of the hoses and heads. A “standby” temperature may be programmed so that the temperature zones can be maintained at a lower temperature when the ASU is not in active use, enabling rapid return to normal operation. The seven-day scheduler allows programmable automatic startup and shutdown of the ASU throughout the workweek.

With these flexible temperature programming features, the Dynamelt system increases adhesive life by eliminating prolonged high adhesive temperatures. It reduces energy consumption and brings the system up to normal operating temperatures in the shortest possible time.

A four-layered, shielded CPU board protects the microprocessor from external interference. The temperature control can interlock the parent machine with preselected adhesive temperatures so that production automatically begins when adhesive temperatures are correct for the application. All system temperature values can easily and quickly be programmed. An optional remote control panel gives control and monitoring flexibility.

Digital readout of system conditions is provided. A security code can restrict access to system programming and parameters. The CPU monitors the electronic circuitry and provides alarms for error conditions.

The Dynamelt M ASU uses an extremely dependable gear pump(s) to assure a smoother and higher precision flow. The single or dual pumps are driven by individual drives.

The Dynamelt’s teflon-coated hopper accepts adhesive in all popular forms, including pellets, slugs and blocks. The ASU can accomodate air-actuated automatic applicators (heads), electric applicators, hand-held applicators and/or special applicators. Options available include pressure gauge, drop-in grid, pendant control, adhesive level control, digital pressure readout and electric clutch.

Specifications

Environmental:

Storage/ shipping temperature . . . . . -40° C to 70°C (-40° F to 158°F)
Ambient service temperature . . . . . -7° C to 50°C (20° F to 122°F)
Noise emission . . . . . < 60 dbA at 1 meter (39 inches)

Physical:

Dimensions . . . . . see dimensional layouts on following pages
Number of heads/ hoses . . . . . 1 to 4 heads/ hoses
Number of return hoses or auxillary zones . . . . . 1 to 4
Number of hopper temperature zones . . . . . 2 or 3 (add 1 for optional drop-in grid)
Number of pumps/ motors . . . . . 1 or 2
Number of standard drop-in grids 1
Number of (optional) drop-in grids 1
Gear pumps . . . . . 2.92 cc/rev standard
Enclosure . . . . . styled, durable metal,dust and splatter resistant
Hose connections . . . . . universal 15-pin Amphenol connectors at asu, wrench-secured fluid fittings (#6 JIC)
Hopper (tank) capacity . . . . . 35 kg/ 77 lb
Hopper construction . . . . . machined welded aluminum, Teflon impregnated
Filtration . . . . . hopper bottom screen, large pleated pump outlet filter
Weight of base unit, empty . . . . . tbd
Adhesive form . . . . . accepts most forms

Electrical:

Supply voltage . . . . . 200-240 VAC/ 3p/ 50-60 Hz
380-400 VAC/ 3p (“Wye”, “Y” or 5-wire connection)/ 50-60 Hz
Minimum supply amperes . . . . . see circuit breaker size
Power consumption: hopper and drop-in-grid . . . . . 7500 watts
Hopper heater type . . . . . cast-in tubular
Temperature control . . . . . microprocessor-based proportional integral derivitive (PID)
Temperature sensors . . . . . 100 Ohm Platinum RTD standard
120 Ohm Nickel RTD optional
Electrical connectors . . . . . durable, latching connectors
Motor . . . . . 1/4 hp, alternating current TEFC* motor, direct drive, horizontal orientation
Maximum current available for each hose or head . . . . . 10 ampere

** totally enclosed, fan cooled*

Performance:

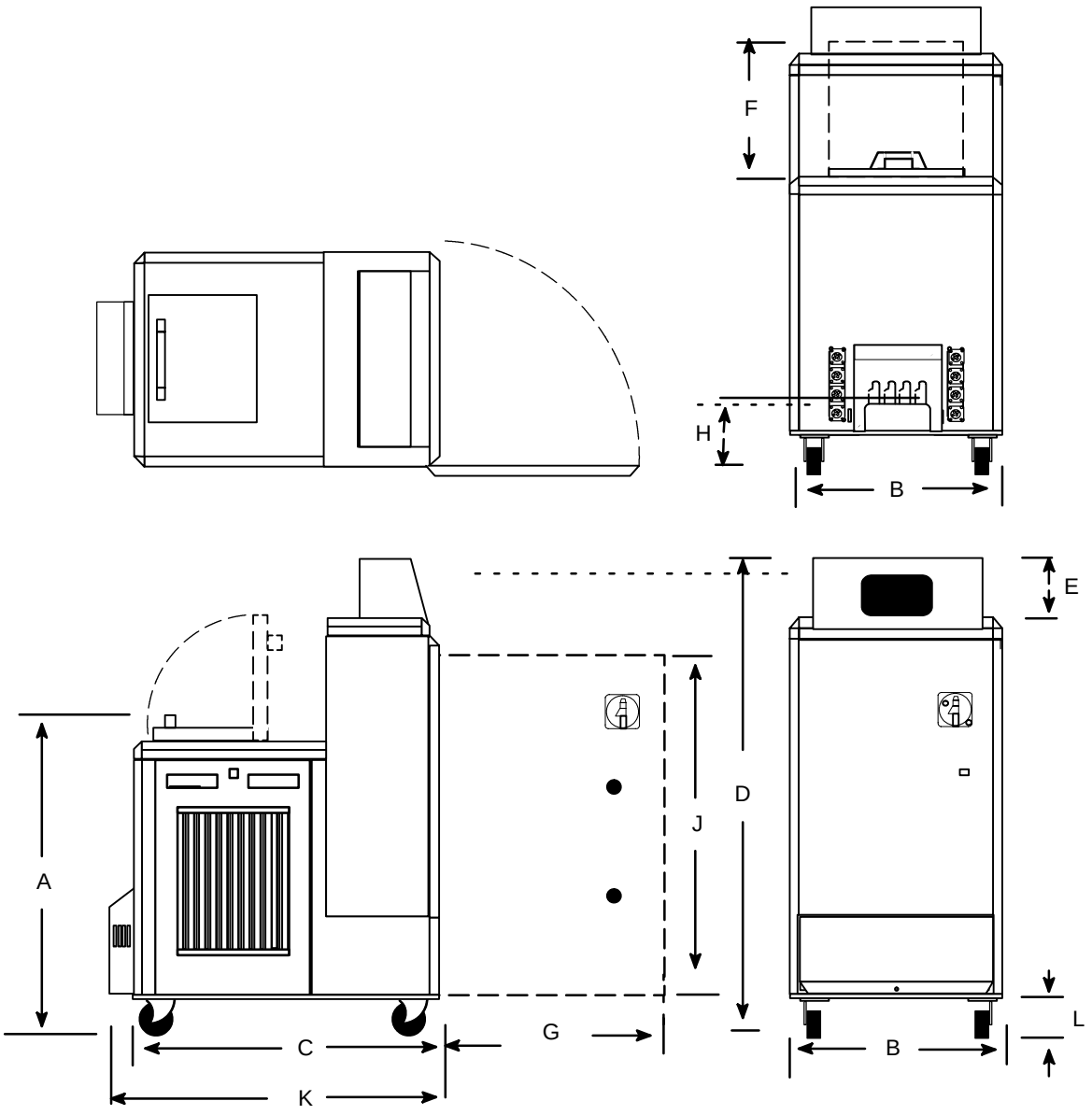
Adhesive temperature control range . . . . . 40°C to 232°C (100°F to 450°F)
Standby adhesive temperature range . . . . . up to 80°C (150°F) lower than setpoint
Hopper ready adhesive temperature deviation (factory set/ field adjustable) ± 20°C (36°F) from setpoint
Over-temperature cutoff for hopper . . . . . 232°C (450°F)
Adhesive viscosity . . . . . 500 to 50,000 centipoise
Warm-up time, full hopper . . . . . approximately 0.5 hour
Typical adhesive melt rate (depends on adhesive used) . . . . . 18-65 kg/hr (40-143 lb/hr)
Adhesive pressure . . . . . up to 68 bar (1000 psi) maximum

DynaControl Temperature Control:

Controller power board . . . . . 48 zones, modular construction
Display type . . . . . graphic, liquid crystal
Temperature control zones (DM35) . . . . . 16 maximum with solid state relays
Power output . . . . . hopper: 5000 watt
hose: 1200
applicator head: 1200 watt
auxiliary: 2000 watt
Solid state relay . . . . . 3-15 VDC
Line speed inputs . . . . . 1 to 2

Other:

Display languages . . . . . English, French, German, Spanish, Swedish, Italian, Japanese, Portugese and Dutch
Operator interface . . . . . multi-zone, liquid crystal display with alpha/numeric keyboard and function keys
Temperature standby . . . . . yes
High and low temp alarms . . . . . yes
Ready interlock . . . . . yes
Password protection . . . . . yes
Sequential heating . . . . . yes (hopper, hose, head staged heating)
Sensor open alarm . . . . . yes
RS232 and RS485 communications capable . . . . . yes
Line Speed Tracking . . . . . yes
Seven-day scheduler . . . . . yes
CE approval granted . . . . . yes



DIMENSION	A	B	C	D	E	F	G	H	J	K	L
mm	863.60	560	800.10	1346.2	177.8	336.55	558.80	228.60	782.32	878	107.2
inches	34.00	22.05	31.5	53.00	7.00	13.25	22.00	9.00	30.80	34.57	4.22

DYNAMELT M35 DCL Installation Dimensions

Total System Wattage Capacity

MAXIMUM WATTAGE	M35
Hopper + High Temp Heater	6000 w
Pre-Melt	2500w
Optional Drop-in Grid	2500w
Up to 4 Hose Zones (1200 w each)	4800 w
Up to 4 Applicator Zones (1200 w each)	4800 w
Up to 4 AUX Zones (2000 w each)	8000 w
Maximum System Wattage:	***28,600 w***

Main Circuit Breaker Determination

Main circuit breakers vary depending on each unit's system configuration. ITW Dynatec typically determines the main circuit breaker by the mains load for a system, which, by codes, should be 125% to 150% of the maximum load. If a customer later modifies his system (by adding heads, hoses, auxiliary outputs, etc.), the main breaker may need to be upgraded to reflect the increase in load.

To determine your existing main circuit breaker, first determine if the ASU has been modified and the breaker upgraded accordingly. If not, and the breaker is original to the ASU, you will find the main circuit breaker listed in the Panel Box Assembly (PBA) section of the indented bill of materials inserted at the back of this manual. The main circuit breaker is the largest amperage circuit breaker listed in that bill of materials.

Definition of Code: DYNAMELT DM 35 ASU w. DynaControl Controller

ASU Code: M XX D X #XXX / #XXX X D# PX - XX, X, X . . .

M 35 D N 1GAS / 1ZLS 2 D2 P2 - F1 G C

Code	PN	Base Unit
35	106049	35kg (77 lb) Hopper

Code	Power
2	240V/ 3P Delta/ no neutral
3	380V/ 3P Star/ neutral only

D DynaControl Controller

Motor/ Drive Groups (1/ pump)
=Total number of drives

Drive Setup

# Drives	# Front	# Rear
1 drive	**1**	**0**
2 “	**1**	**1**

Code	PN	Grids
N	n/a	Standard
G	804634	Add Drop-in Grids
O	n/a	Omit Drop-in Grids

Code	PN	Panel Box Assembly
PA	806456	1 drive, 2 hose/ 2 head/ 2 auxilliary, 240v
PB	806457	1 drive, 2 hose/ 2 head/ 2 auxilliary, 380v
PC	806458	2 drive, 4 hose/ 4 head/ 4 auxilliary, 240v
PD	806459	2 drive, 4 hose/ 4 head/ 4 auxilliary, 380v

Qty.	Code	PN	Pump(s)
			# = Quantity of each Type of Pump
——	GAS	100860	Dynatec 1.54cc single
——	GBS	100861	Dynatec 3.18cc single
——	GCS	100862	Dynatec 4.5cc single
——	GAD	100863	Dynatec 1.54cc dual
——	GBD	100864	Dynatec 3.18cc dual
——	ZLS	084E372	Zenith 0.160cc single
——	ZDS	084E428	Zenith 0.297cc single
——	ZES	084E374	Zenith 0.584cc single
——	ZFS	084E430	Zenith 1.168 single
——	ZGS	084E434	Zenith 2.92cc single
——	SHS	108875	S&P 8.5cc single
——	ZLD	084E387	Zenith 0.160cc dual
——	ZDD	084E388	Zenith 0.297cc dual
——	ZED	084E 389	Zenith 0.584cc dual
——	ZFD	084E432	Zenith 1.168 dual
——	SGD	108874	S&P 2.92cc dual
——	SPC		Special Pump (see sales order)

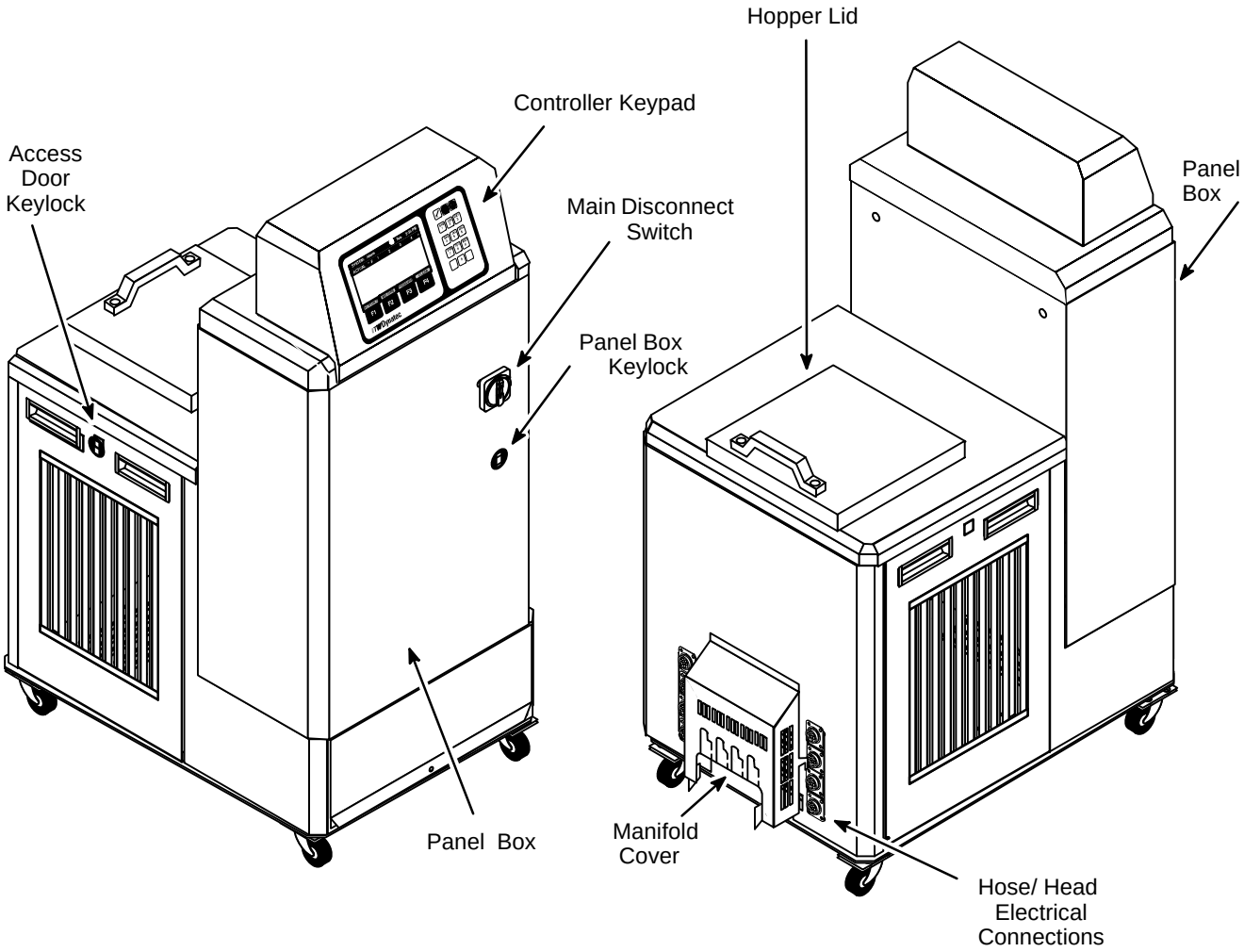
Code	PN	Options
D		Digital Pressure Readout
E	107945	Electric Clutch Kit
Fx		*Filter Selection*
F1	101246	40 mesh outlet filter
F2	101247	100 mesh outlet filter (Standard)
F3	106273	150 mesh outlet filter
G	805641	Analog Pressure Gauge Kit
K	N06642	Signal Isolator
L	802886	One-Point Level Control Assy
P	107643	Remote Display Kit
Q	108475	RS232/485 Communication
R	108313	Digital RPM Readout
Y	108425	Handgun Trigger Kit
Z	106103	Drain Valve

Chapter 3
INSTALLATION

Placing the DYNAMELT M ASU

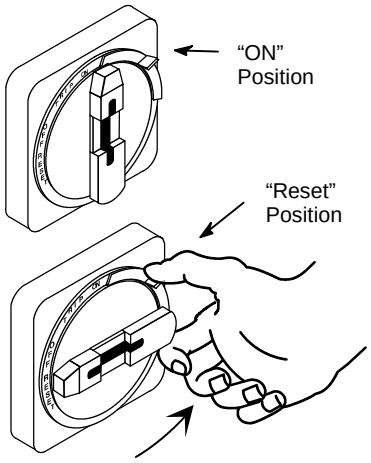
The DYNAMELT® M SERIES ASU can stand alone on flat surfaces. The main electrical power and the serial communication connections come in from below the unit and connect under the DynaControl keypad, so access is needed there.

For installation dimensions, see illustration on page 2-4.



The DYNAMELT M35 DCL ASU

Re-read Chapter 1 "Safety Precautions" before performing any installation procedures. All installation procedures must be performed by qualified, trained technicians.



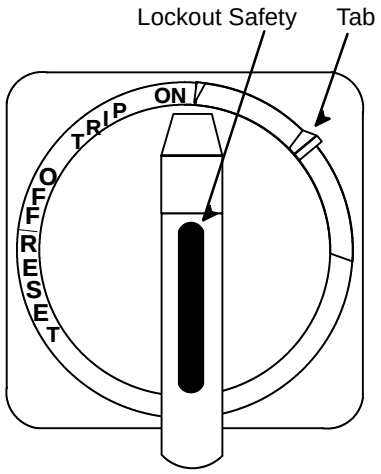
To Open/ Close Panel Box Door

1. With the key supplied, unlock the panel box door.
2. Turn the main disconnect switch counterclockwise to "Reset" while pushing the tab clockwise with your thumb.
3. Pull door open.
4. *To close:* Turn switch to "ON". Hold door closed while turning swith to "Reset" and then back to "ON".
5. Lock the panel box door with the key.

Installation

After the DYNAMELT M SERIES ASU has been properly positioned, the following general sequence should be followed for installation:

1. Make sure that incoming line power to the ASU and that the unit's main disconnect switch are turned OFF.



Main Disconnect Switch

DANGER HIGH VOLTAGE

Disconnect and lock out input power to the application system, using the lockout safety illustrated above, before starting any installation procedures. Make sure there is no electrical power on the leads you will be connecting.

2. Within the panel box assembly: Connect 3 electrical leads with the appropriate voltage to the main circuit breaker and connect one electrical lead to the ground (PE) terminal (see diagram following).

   380v ASUs only: In addition to above, connect one lead to the neutral terminal.

CAUTION: Grounding conductors never carry electrical current. The use of a neutral conducting wire as earth ground is incorrect and may cause damage to the controller.

cont.

3. At installation, the customer must make the following terminal connections into the ASU's printed circuit boards (PCBs). The boards do not need to be removed from the ASU in order to make connections.

   See the detailed layout on the next page for locations, and refer to the detailed layout drawings of the PCBs in Ch. 7, if needed.

Terminal	Circuit	Location
Required connections for standard 240 vac ASU:		
PE	Input Power from Main Power 240vac Ground	Main Power Switch/L1, L2, L3 Terminal rail
Required connections for 380 vac ASU:		
N, PE	Input Power, from Main Power, 380 vac Neutral, Ground	Main Power Switch/L1, L2, L3 Terminal rail
Non-essential connections; connect if feature is desired:		
R1, R2	Normally Open Ready (parent machine interlock)	Power PCB/ JS4/ pins 1 & 2 and Power PCB/ JS2/ pins 1 & 2
A1, A2	Normally Closed Alarm (controller display alarms)	CPU PCB/ X1/ pins 1 & 2
E1, E2	External Standby (controller standby mode)	CPU/ X4/ connect 5 and 9 or 10
P1, P2	Program Select 1&2 (controller program selection)	CPU/ X4/ connect 1 to 9 or 10**
P3, P4	Program Select 3&4 " " "	CPU/ X4/ connect 7 to 9 or 10**
	Power On Output	Power PCB/ JS1/ pins 1 & 2
Options: Make connections for the following if installed on your ASU:		
S1, S2	Tachometer (line speed tracking)	MCI*/ X3/ 0 (ground) & 10 (+)
H1, H2	Hand-Held Applicator, Footswitch	MCI*/ X3/ TR
	Low Adhesive Level (output alarm)	CPU PCB/ X1/ pins 3 & 4
	Pressure Transducer(s) (1 to 4 transducers)	PSI PCB/ X1, X2, X3, X4
	Pressure Transducer(s) (high & low psi alarms)	PSI PCB/ X6
	Clutch Customer Enable (for motor 1)	Clutch PCB/ JS1/ pins 1 & 2
	Clutch Customer Enable (for motor 2)	Clutch PCB/ JS1/ pins 3 & 4
Ribboncable	RS232/485 Communication	Display CPU PCB

* MCI = Motor Control Interface PC Board

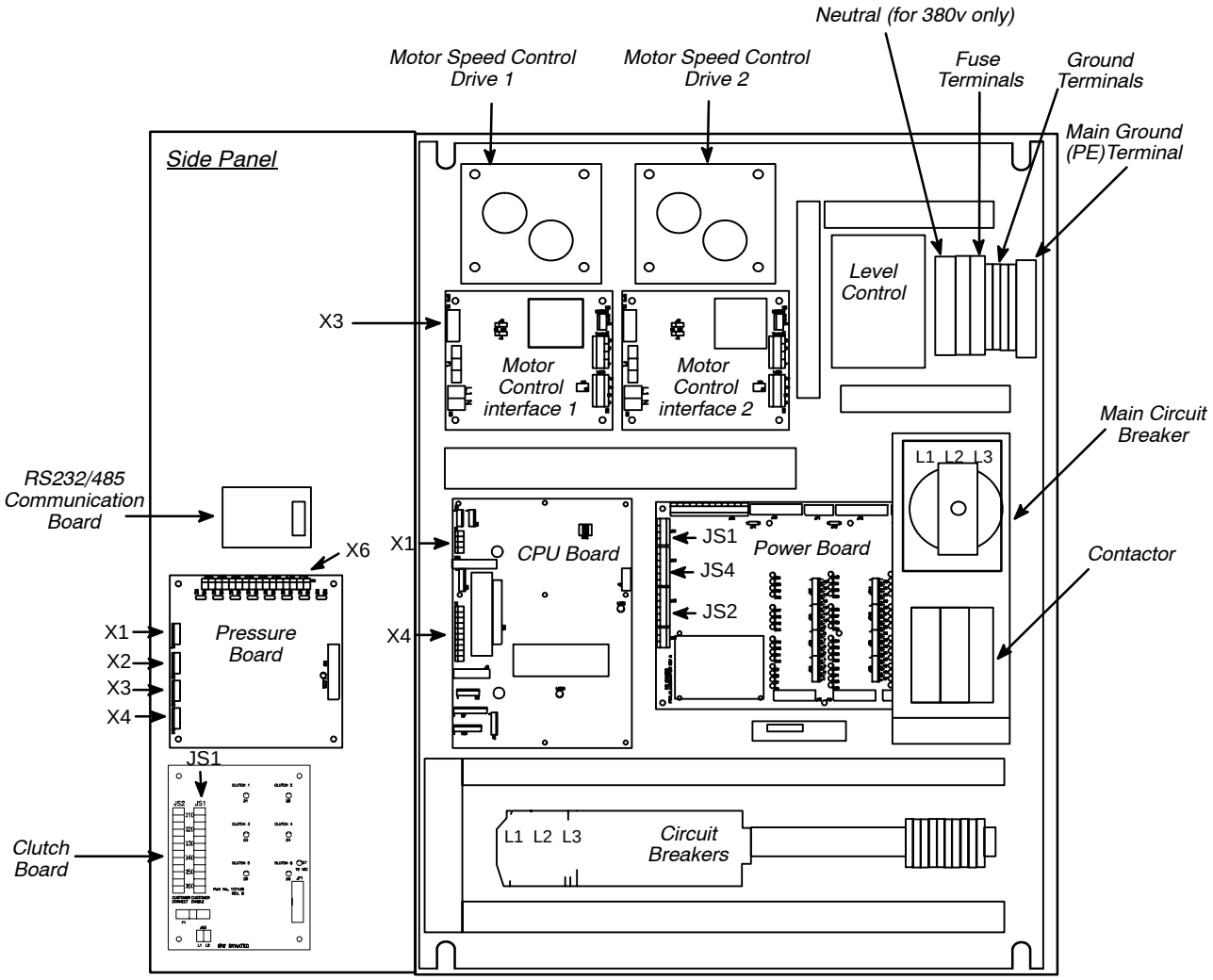
User Connections

** *Program Selection Table*		
P1/P2 Pin 1	**P3/P4 Pin 7**	**Program #**
open	open	= Program 1
closed	open	= Program 2
open	closed	= Program 3
closed	closed	= Program 4

Printed Circuit Board Location Diagram

The printed circuit boards (PCBs) are located within the main panel box assembly.

Note: When multiple PCBs are installed to accomodate multiple components (ie, two motor speed control PCBs and two motor control interface PCBs to accomodate two motors, as illustrated below), make connections to all PCBs.



Typical Panel Box Layout

4. The adhesive hoses are connected at the rear cover (see illustration on page 3-6). Each hose is connected at both an adhesive port and an electrical connect. Make your electrical hose connections at the numbered connects above the filter manifolds. Route hoses so that there is at least an eight-inch radius at any bend. Do not hang hoses without proper support. Do not crimp, clamp, squeeze or tie hoses.

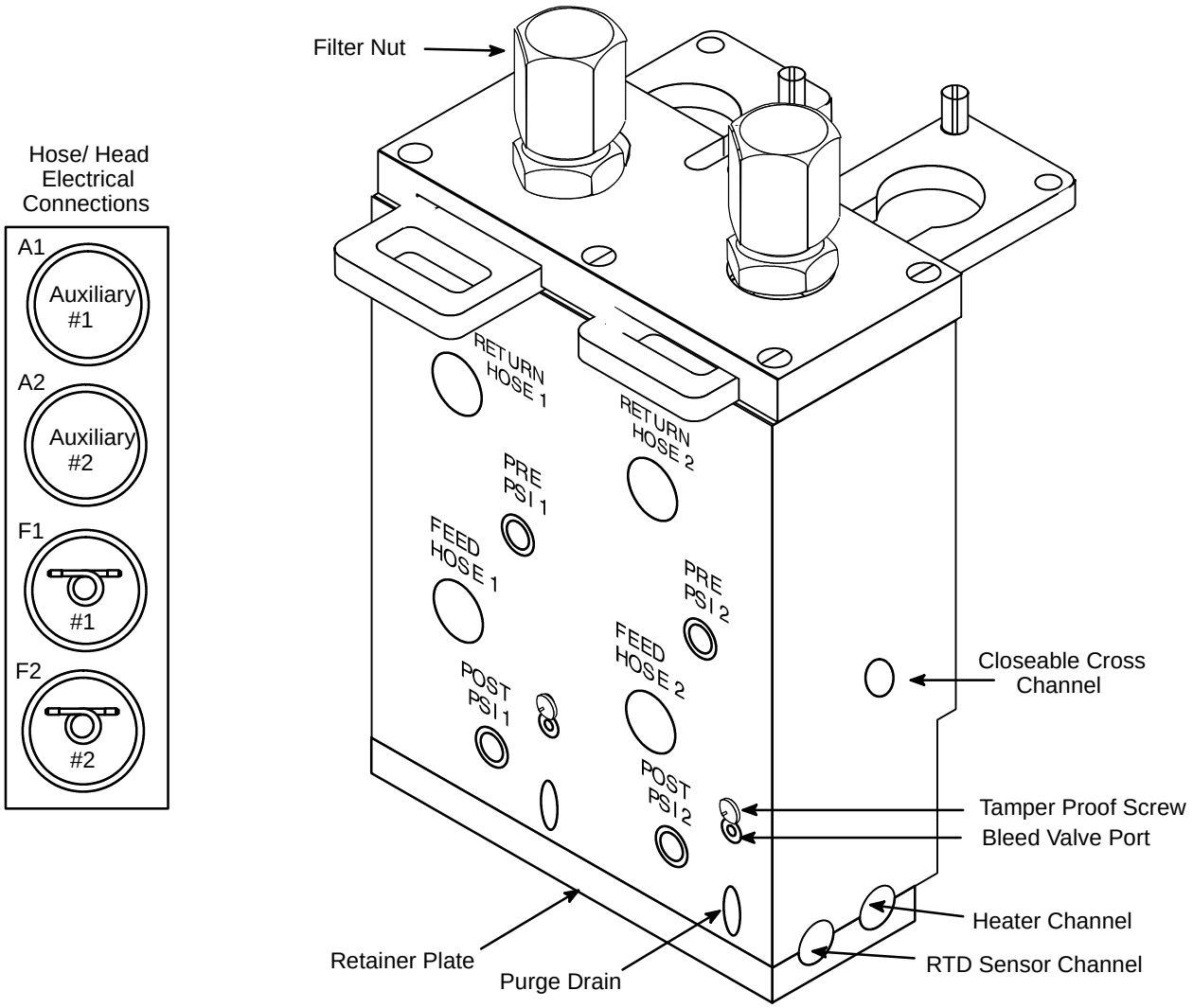
   Two feed hose adhesive ports are located at the bottom of each filter manifold. When making hose connections, use the numbered guides shown on the illustration to coordinate; ie. when using one hose make your hookup to electrical connection #1 and adhesive port #1. When using two heads/ hoses, hookup hose/ head #1 to electrical connection #1 and adhesive port #1, then hookup hose/ head #2 to electrical connection #2 and adhesive port #2, etc.

   Two return hose adhesive ports are located at the top of each filter manifold. Use the illustration to coordinate adhesive port and electrical connections as above. Return hoses are designated as “auxiliary” ports.

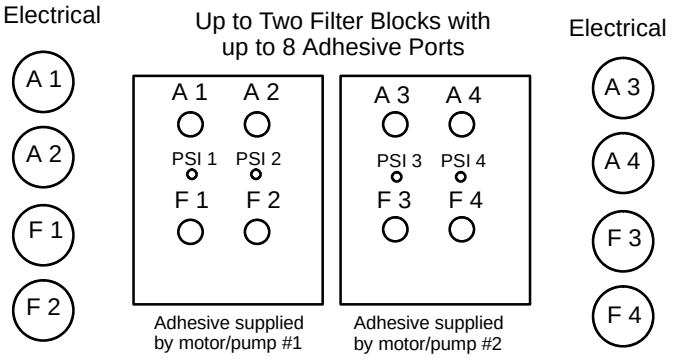
5. Connect (optional) PSI transducers at the PSI ports labeled on the filter manifold. Position them from left to right across the manifolds as shown in the lower illustration on page 3-6. Transducers measuring adhesive pressure before it enters the filter use the ports stamped “Pre PSI” and transducers measuring pressure after the filter use the ports stamped “Post PSI”. Transducers must be wired into the pressure printed circuit board.

   Units not using transducers may use either a PSI port or a feed hose port to mount a (optional) pressure gauge. If all ports are in use, the pressure gauge may be installed in line with a hose.

   Refer to the hose and applicator manuals for further details on these items.



Hose/ Head Electrical and Adhesive Connections



Up to Two Filter Blocks with up to 8 Adhesive Ports

Note:
Always connect Auxiliary (Return) Hose #1 (A1) to Auxiliary Electrical Connect #1 (A1), Feed Hose #1 (F1) to Feed Electrical Connect #1 (F1), etc. as described on page 3-3.

Dynamelt M35: Electrical Connection and Filter Manifold Arrangement for Maximum Head/ Hose Configuration

Adding Adhesive

The adhesive level in the melt tank should be maintained at 13mm to 100mm (1/2" to 4") from the top of the hopper. Where applications demand a high output volume of adhesive, add small amounts of adhesive frequently. Adding large amounts of adhesive to an almost empty hopper will lower the temperature of the adhesive in the hopper and may cause the ASU to fall below its READY setpoint.

Changing the Adhesive Formula

If a different adhesive formulation from the one being currently used is needed, the system will have to be flushed if the two formulations are incompatible. See Chapter 6 of this manual for the proper flushing procedure. When in doubt about adhesive compatibility, flush your system.

Field Installation of Controller Options

Customers who choose to modify their adhesive supply unit with ITW Dynatec manufactured options should assure that only qualified technicians perform such installations. The installation of options that require specific procedures and/ or calibration are outlined in this chapter.

Before controller options are installed, always turn the controller's main power switch OFF. In most cases, turning the controller OFF will assure that the controller will retain its programmed parameters and configuration. Re-booting is not necessary.

Adjusting the Pressure Relief Valve

The function of the pressure relief valve is to protect the gear pump(s) and the pump drive components from overload and to protect other components from potentially damaging pressure levels. The system will allow pressures up to 1000 PSI, however, typical factory settings are 500 PSI.

WARNING HIGH PRESSURE

NOTE: The following procedure will require the hot melt adhesive to be at a high temperature and the application system to have substantial pressure. Safety glasses, insulated gloves and long-sleeved protective clothing must be worn to prevent the possibility of serious injury from the molten adhesive. Refer to Chapter 1 and the section entitled "SAFETY PRECAUTIONS" for further details and First Aid information.

To Adjust Pressure Relief:

Note: This adjustment should be done with a melt pressure gauge or a pressure transducer installed. Failure to use proper equipment can result in excessive pressure levels.

1. Turn the application system ON and raise the temperatures of all components to normal operating temperatures.

Note: Position a bucket or other waste receptacle under the applicator(s) so that adhesive will be collected during the adjustment procedure.

2. At the controller, set the motor speed to "0" so that the gearmotor is not turning.

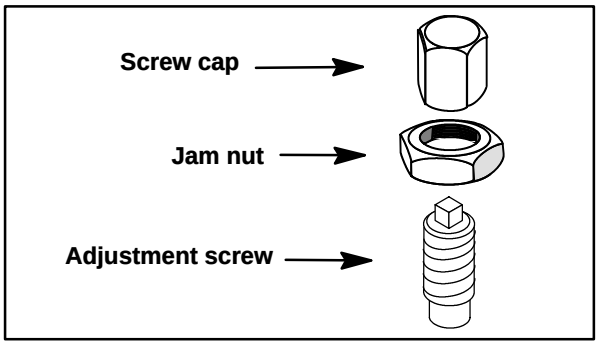
3. Locate the pressure relief assembly on the filter manifold (where the hoses attach to the ASU) and remove the access cover.

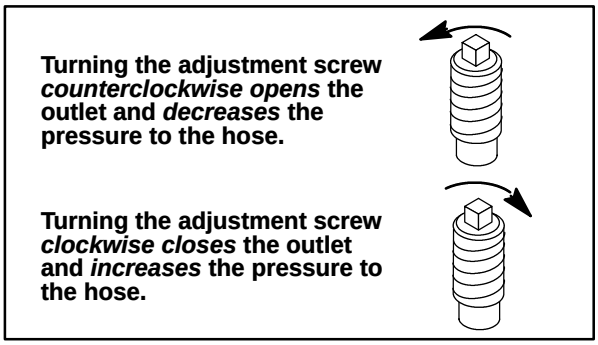
4. Position a heat-resistant container below the manifold. With a hex key screwdriver (allen wrench), slowly loosen the manifold's two purge set screws (do not attempt to remove them). Allow adhesive and pressure to escape out of the manifold. Adhesive will drain into the container.

5. Remove the adjustment screw cap (see diagrams below) and loosen the jam nut. Turn the adjustment screw counter-clockwise until it is two turns from being completely out of the filter plug.

Note: if the adjustment screw comes out of the filter plug, be prepared for some adhesive to flow out of the screw hole.

cont.




Turning the adjustment screw *counterclockwise opens* the outlet and *decreases* the pressure to the hose.
Turning the adjustment screw *clockwise closes* the outlet and *increases* the pressure to the hose.

6. At the controller, turn the motor ON to its maximum operating speed.

7. Actuate (open) the valves on the applicator(s) in order to fill them with adhesive and purge air from the system.

8. Close the valves (those openend in the last step) to stop the flow of adhesive.

9. Using a wrench, turn the adjustment screw clockwise to increase the pressure to the applicator(s).

CAUTION: Approach desired pressure with caution. DO NOT TURN THE ADJUSTMENT SCREW COMPLETELY CLOCKWISE (BOTTOMING IT INTO THE PLUG), since this would shut off the pressure relief channel and could cause extensive damage to the pump, motor and seals. Be aware that the higher the adjusted pressure, the more sensitive the adjustment is (i.e., at higher pressures, smaller adjustments to the screw will make larger changes to actual pressure).

10. After desired pressure is achieved, tighten the jam nut down onto the adjustment screw and lock it in place.

11. Replace and tighten the adjustment screw cap.

12. While the motor is operating at maximum speed, observe the adhesive flow from the applicator(s).

13. Reduce the motor speed, in increments of about 10%, until the adhesive flow begins to decrease.

Note: Though the speed of the motor is reduced, there will be no change in the amount of adhesive flow coming out of the applicator. This is because the pressure relief is designed to allow only a maximum adhesive pressure regardless of the motor speed past a certain point.

Then, increase motor speed in smaller increments (1 to 5%) until adhesive flow returns to the desired amount.

Note: This is the optimum point of operation for the motor, pump and pressure relief. It will also facilitate the best system performance and reduce wear on these components.

The application system is now adjusted for normal operation.

14. Re-tighten the two purge screws and re-install the access cover.

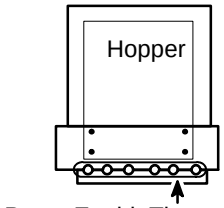
Pump Enable (Ready) Thermostat Calibration

The Pump Enable (Ready) Thermostat is preset to 132°C (270°F), unless the customer has specified a different preset temperature on his original ASU order. Generally, the pump enable thermostat is set approximately 30°C (50°F) lower than the application setpoint. If a different temperature is desired, use the following procedure to re-calibrate the thermostat.

CAUTION: DO NOT set the pump enable thermostat lower than the softening point of your adhesive or pump damage may result.

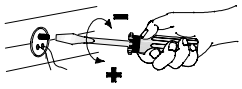
As an example: the operator desires to lower the preset Pump Ready temperature to 107°C (225°F).

1. At the controller keypad, set the hopper temperature setpoint to the temperature at which you want the pump to start, i.e. 107°C (225°F).

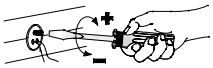


2. Use the key to unlock the side door, then remove it, being carefull not to pull out the ground wire attached.

3. Wait for the hopper temperature to stabilize at 107°C (225°F), then:
   a. *For thermostats with purple & black wire leads or tan leads:* turn the thermostat's adjustment screw counter-clockwise to increase the temperature (or clockwise to decrease it) until the pump's motor begins turning Adjust no further.



   b. *For thermostats with tan (with tracer) wire leads:* turn the thermostat's adjustment screw clockwise to increase the temperature (or counter-clockwise to decrease it) untilthe pump's motor begins turning Adjust no further.



4. Replace the side door.

5. At the keypad, re-set the hopper temperature setpoint to its correct "run" temperature.

Calibration of the Optional Voltage Tachometer

A voltage tachometer allows the system operator to monitor gear pump motor speed from the controller. This information is useful since the amount of glue dispensed per product can be varied by adjusting the motor rpm (an increase in rpm = an increase in glue dispensed).

DANGER HIGH VOLTAGE	**WARNING HOT SURFACE**
Dynamelt systems use electrical power that can be life threatening and hot-melt adhesives that can cause serious burns. Be sure to read and follow the safety procedures in Chapter 1 of this manual. *Only qualified persons accustomed to working with live electrical circuits should perform this procedure on the Dynamelt system.*	

Calibration Procedure

1. Turn the application system ON and raise the temperatures of all components to normal operating temperatures.

2. Turn main power OFF and open the panel box door. Restore power to the ASU.

3. At the controller keypad, verify normal operation in AUTO, STOP and MANUAL modes (refer to “Motor Control Programming” in Chapter 5 if needed).

4. At the controller keypad, set motor speed to MANUAL mode and to 100% full speed.

5. With an external tachometer, measure the motor RPM.

6. On the Motor Control Interface PCB, turn the MAX ADJUST potentiometer until the RPM of the external tachometer reads 1800 rpm.

7. Calibration of this motor is complete. If additional motors are used on your application system, repeat the above procedure for each motor.

8. Close the panel box door and restore application system to normal operation.

Installation of the Optional Tach Generator or a DC Tracking Signal

The installation of a tach generator or a similar DC tracking signal allows speed tracking of the gear pump through voltage following. Multiple motor boards may be wired in parallel to the tach generator. On the controller, voltage following is referred to as the "AUTO" Mode of the motor control.

Installation Procedure

DANGER HIGH VOLTAGE

Dynamelt systems use electrical power that can be life threatening. Disconnect and lock out input power to the application system before starting any installation procedures.

1. Disconnect and lockout input power to the application system.

2. Open the panel box and locate the Motor Control Interface Board (see layout illustrtion in Chapter 7). The device will be connected to the "0" and "10" terminals on X3.

3. A. To install a tach generator:
   i. If, when facing the shaft on the tach generator, the rotation of the shaft is *clockwise*, connect the black lead wire to the "0" terminal and connect the white lead wire to "10".
   or
   ii. If, when facing the shaft on the tach generator, the rotation of the shaft is *counter-clockwise*, connect the black lead wire to the "10" and connect the white lead wire to "0".

   iii. Verify that the gear pump motor is running at full speed when set to 100% in MANUAL mode. The output of the tach generator can be adjusted, depending on the application, but it must be at least 10 VDC to obtain full adhesive gear pump speed.

   Note: under no conditions will the motor ever run faster than this speed (100% Manual).

   B. To install a similar DC tracking device (not a tach generator):
   Connect the DC tracking voltage signals to the terminals so that the negative lead is connected to "0" and the positive lead is connected to "10".

   Note: the tracking voltage must be at least 0-10 VDC, but not more than 0-25 VDC.

4. Close the ASU's panel box door.

5. Re-connect input power and restore the application system to normal operation.

Procede to "Calibration of the Optional Tach Generator or DC Tracking Signal".

Calibration of the Optional Tach Generator or DC Tracking Signal

After installation of a tach generator (or a similar DC tracking signal), the device must be calibrated at the DynaControl controller.

Prior to calibration, turn the application system ON and allow all components to warm up to normal operating temperatures (above ready temperatures).

1. Perform the following sequence at the controller keypad for each motor:
   a. Go to Motors screen.
   b. Choose AUTO mode. Press Enter.
   c. Scroll to Min % and enter a value of “0”. Press Enter.
   d. Scroll to Max % and enter a value of “100”. Press Enter.

2. Energize the parent line (tracking signal) to its full speed (at least 10 VDC at the “0” and “10” terminals at X3 on the Motor Control Interface printed circuit board).

3. On the Motor Control Interface printed circuit board (see illustration in Chapter 7) locate and adjust the web speed scaling potentiometer (VR1) clockwise until the “SET %” is below 99.8. Then adjust counter-clockwise until it equals 99.8%.

4. The system is now calibrated so that full parent machine speed corresponds to full speed of the gear pump.

The amount of adhesive dispensed can now be adjusted by trimming the pump RPM at the AUTO menu of the controller by adjusting the “MAX %” value down from the factory default of 100%. Adjusting the “MIN %” value corresponds to the pump speed when the parent line is stopped (0.0 volts at the “0” and “10” terminals). In most applications, the factory default (MIN % = 0) is used.

Level Control, Capacitive, Sensor with Amp

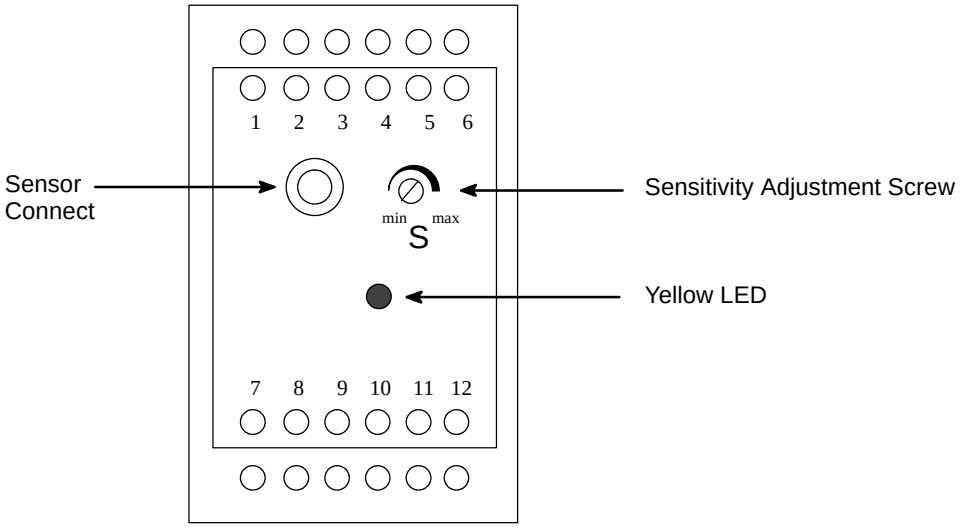
The level control device informs the ASU's operator, via a "Level Low" message on the Dyna-Control controller's System Status display, that the ASU's hopper adhesive level is low. When the alarm activates, press "C" to reset it. You then have five minutes to refill the hopper before the alarm reactivates and the ASU's pumps stop.

The capacitive sensor is mounted in the hopper. The sensor cable is plugged into the amplifier. DO NOT CUT the sensor cable.

Adjustment of the PN N08122 Level Control

To adjust the adhesive level control's sensitivity, access the control's amplifier, located inside the panel box assembly. On the amplifier (diagrammed below) is a sensitivity adjustment screw.

Turn the screw clockwise to increase sensitivity (or counter-clockwise to decrease). The yellow LED lights to indicate the presence of adhesive. When the LED goes out, the alarm will activate.



Amplifier

Typical Start-Up and Shut Down of the DYNAMELT M Application System

The following simplified sequence assumes that the DynaControl Controller has been programmed.

Start Up Procedures

1. Fill the ASU's hopper with clean hot-melt adhesive to within a couple of centimeters (inches) of the top of the hopper. Close the hopper lid immediately to prevent contaminants from falling in. (Cover your bulk supply of adhesive to prevent contaminants also.)

2. Switch ON the Main Disconnect (the circuit breaker located on the panel box).

3. At the DynaControl keypad, press the controller's F1 button, if prompted to do so.

4. Allow adequate time (approximately 20-30 min.) for the adhesive to melt and the temperatures of the temperature zones to stabilize. Monitor the System Status display to see when "Heat Up" changes to "Ready". Undertemp arrows will blink until the temperature zones are up to ready temperature.

5. When temperatures are ready, the pump and motor are enabled to pump adhesive.

At the pump screen:

Select Auto or Manual Mode. Select desired pump, press Enter.

a. *If Pump is in Auto Mode:* Adhesive will begin to pump when the production line begins to operate.

b. *If Pump is in Manual Mode:*

i. Press Manual (F1). Press Enter.

ii. Enter desired speed value. Press Enter.

iii. Scroll to select next pump (if applicable). Repeat steps i thru iii until all pumps are programmed.

Adhesive will begin to pump once the pump enable thermostat closes and "Ready" condition is attained.

Shut Down Procedures

At the pump screen:

1. *If Pump is in Auto Mode:*
   a. Press STOP or STOP ALL (F3).
   b. Turn OFF the Main Disconnect Switch.

2. *If Pump is in Manual Mode:*
   a. Press STOP or STOP ALL (F3).
   b. Turn OFF the Main Disconnect Switch.

3. *If 7-Day Scheduler is in use:* Turn ON and OFF with the Controller On/Off pushbutton.

Note: Except in the case of the 7-Day Scheduler, use of the Main Power Switch to turn the unit OFF will avoid unexpected ASU activation in the event of a power outtage.

Storage and Disposal of the DYNAMELT M Application System

Temporary Storage of the Unit

1. Flush the adhesive application system with flushing fluid (PN L15653), following the instructions detailed in chapter 6 of this manual.

2. Clean or replace both the outlet filter and the primary filter, following instructions detailed in chapter 6.

3. Shut OFF all pressure and power sources.

4. Release residual air pressure (if applicable).

5. Remove all residual adhesive and wipe components clean.

6. Remove all air lines (if applicable) and all power supply cables.

7. Pack the unit in a corrosion-proof manner.

8. Store the unit in such a way that it is protected from damage.

Disposal of the Unit

1. Shut OFF all pressure and power sources.

2. Release residual air pressure (if applicable).

3. Remove all residual adhesive.

4. Remove all air and adhesive hoses and all power supply cables.

5. Dismantle all components and sort into mechanical and electrical components.

6. Arrange for all components to be recycled.

Chapter 4
DynaControl™ CONTROLLER SET-UP

Temperature Control Functions in General

The DynaControl microprocessor-based proportional temperature control in the ASU performs a number of functions that help to maintain adhesive setpoints in all temperature zones of the DYNAMELT® system. It maintains permanent system values (fixed proportional and integration values that have been programmed at the factory, such as the maximum temperature setpoint). It enables the user to program temperature settings and heater on/off sequencing that are appropriate to a specific application. It displays all programmed values, and it includes self-diagnostic malfunction alerts and failure alarms. *Note: Some DynaControl functions are direct temperature conversions between degrees Celsius and Fahrenheit. Other parameters are independently selected values.*

Defining DynaControl Temperature Control Terms

Adhesive Temperature Control Range
The temperature limits within which the ASU, hoses and applicators may be programmed and maintained.

CPU Module
The central processing unit (CPU) of the microprocessor temperature control.

Cold Start
When the ASU resets itself to default setting due to either a malfunction or to a deliberately initiated cold start procedure. When the ASU is turned ON via the Main Power Disconnect Switch.

Default Settings
The factory-set programmable system values that will be in effect if the user does not enter new values. The controller will revert to its defaults whenever it is reset. The DynaControl controller's defaults are listed in this chapter.

Error Indication Alarms
Alarms which indicate that the programmed over-temperature values have been exceeded for one or more hopper, hose or head zones. Alarms may also indicate an open or short-circuited sensor.

Mechanical High-Temperature Protection
A mechanical, redundant thermostat located on the hopper which turns OFF the system at 232°C (450°F).

Microprocessor-based Proportional Temperature Control
The built-in control system that controls, monitors and displays all system temperature values.

cont.

Over-Temperature Setpoint
The programmable temperatures that will cause alarms (blinking up and down display arrows) to occur when those temperatures are exceeded. Power is not disconnected, the READY contact opens and the alarm contact opens. If an external alarm has been connected, it will activate. The over-temp setpoint is the upper limit of the ready temperature range of each zone.

PC Link
Also referred to as remote I/O interface, this is a DynaControl controller option that allows monitoring and programming from a customer-provided PLC (programmable logic controller) or a PC (personal computer).

P-I Loop
A temperature control loop which bases heater output proportional (P) to the difference betweeen setpoint and actual temperature and combines it mathematically with a time (I = integral) factor.

Power I/O PCBs
The Power I/O printed circuit board (PCB) provides control signals to, and monitoring signals from, all the temperature zones in the ASU's system. The ASU's hopper, hoses and applicators are controlled by the Power I/O PCB.

Pump Enable Temperature
The pump enable temperature protects the pump, pump shaft, motor and motor control board from damage by not allowing the pump to activate until a low limit (the programmed pump enable temperature) is achieved.

RTD Sensors
The standard Dynamelt system uses 100-ohm platinum resistance temperature detector sensors for all temperature controls. As an option, the unit can be configured for 120-ohm nickel sensors.

Ready Temperature
The programmable temperature, on gear pump models, which allows the ASU pump to turn ON. The default ready temperature range is a deviation of ± 20°C (± 36°F) from the setpoint. The setpoint minus the deviation is the low limit of the range, and the setpoint plus the deviation is the high limit of the range.

Recipe
A program recipe is a set of temperature setpoints and parameters which the user has programmed and wishes to store in the controller for future use. Up to four recipes may be stored in the DynaControl controller.

Sequential Heating
The heating sequence which allows the slower-heating hopper to reach operating temperature without unnecessary use of electricity for faster-heating hoses and applicators. Sequential heating is the time period during which the hoses and applicators remain OFF while the hopper (and optional drop-in grids) heats up. Hoses and applicators may be independently programmed. If hopper temperature is above ready temperature when the ASU is turned ON, the hose and applicator *cont.*

sequence is bypassed and they will be turned ON. The heat up sequence is restored after Standby is turned from ON to OFF. Sequential heating is not needed for most applications and can delay total system warm-up time.

Standby Condition

The system condition where the ASU, hose and head temperatures are maintained at predetermined reduced temperature values. Standby temperatures are set lower than setpoint temperatures in order to reduce adhesive degradation and energy consumption when the system is temporarily inactive, and to permit rapid system warm-up when run condition is selected.

Setpoint

A programmable temperature that has been selected for hopper, hoses, applicators or auxiliary zones.

Setpoint Limitation

This is a universal maximum temperature for all zones. The programmer cannot program a temperature setpoint higher than the setpoint limitation.

System Logbook

This is the controller's record-keeping function. It contains the DynaControl's list of the last 1,000 controller events**,** its Data Logger which records the last 1000 lines of selected actual temperatures and a counter which records the system's elapsed hours.

Temperature Zone Enable

The temperature zone enable allows the operator to disable unused temperature zones in such a way that they do not ever appear on the controller's display and heating is switched OFF.

Temperature Zone Offset

Due to the separation between the heaters and sensors in some systems, the controller can be programmed to display a temperature for a zone which is different from the sensor's actual temperature. The temperture zone offset mathematically corrects for these temperature differences. Each zone may have an individual offset.

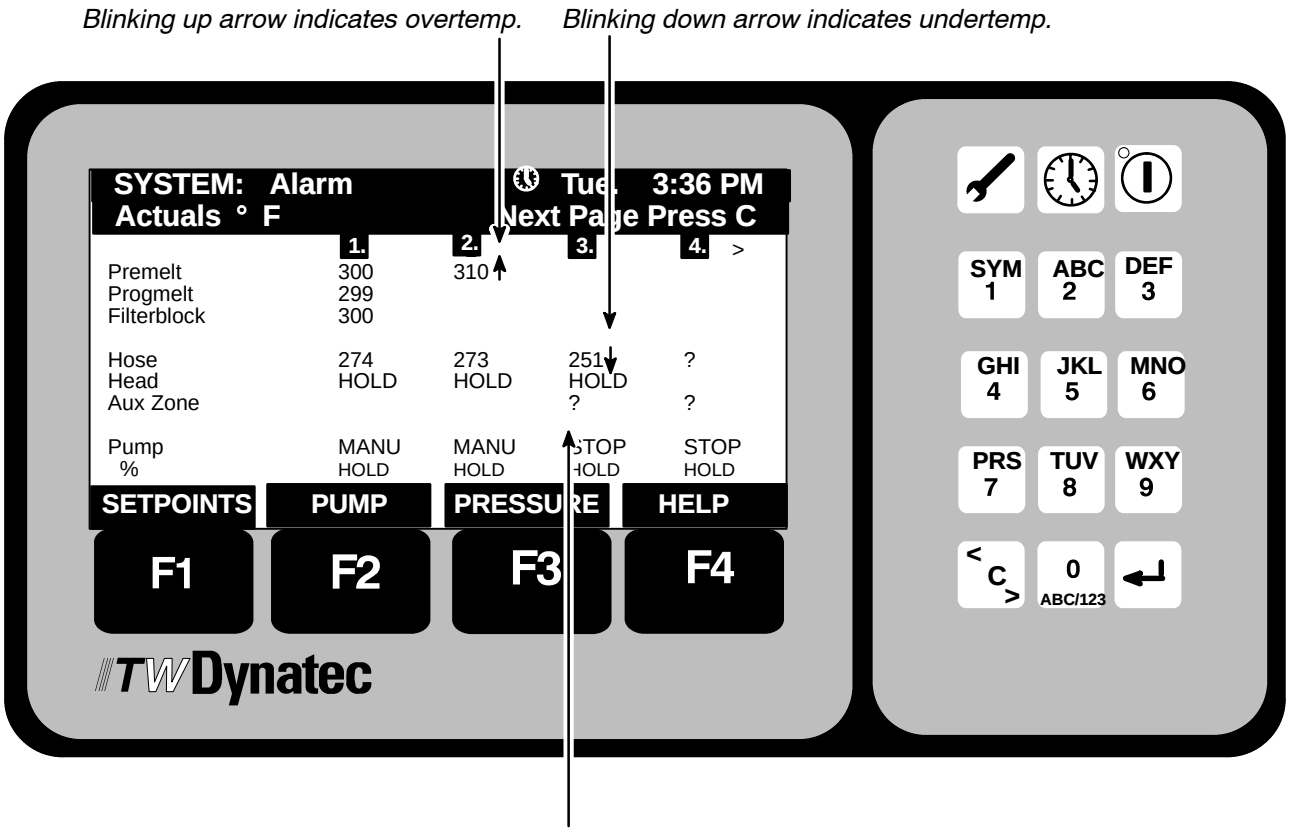
Error Indication & Alarms

Error Indication (Blinking Up and Down Arrows)

The following illustration shows the display screen when one or more error indication conditions occur. The conditions that will trigger an error indication are:

a. When a hopper, hose, head or auxiliary zone has exceeded its selected over-temperature setpoint, which is the setpoint plus its high/low alarm setting, or when it is below its selected under-temperature setpoint, which is the setpoint minus its high/low alarm setting. In these cases, heater power will not be switched off.

b. When a hopper, hose, head or auxiliary zone sensor has an open circuit. In this case, heater power will be switched off.



"?" indicates no sensor (open circuit).

Error Alarms (Message Window)

The display of a message window, as illustrated below, signifies an error alarm. The operator's response to an error alarm is to press "F4" and to troubleshoot.

If a sensor error alarm or an overtemperature alarm occurs during operation, the controller will switch off internal power to the heaters and an appropriate error alarm display will appear.

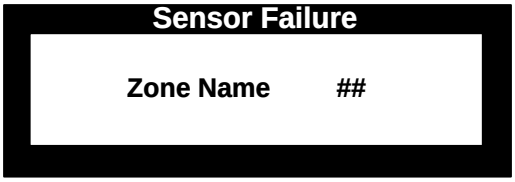
Pressing the "F4" function key acknowledges the error. If several zones display alarms, each must be acknowledged by pressing "F4". The alarm display is switched off and the controller then switches off the faulty zone until the ASU is ready for operation again.

When the actual temperature exceeds the setpoint limitation (plus a tolerance) the overtemperature alarm window is displayed and main power is switched off.

Examples of Error Alarms

The Overtemperature Alarm indicates that the named zone has exceeded its programmed setpoint limitation. The controller will shut off power to the heaters. Press F4 and troubleshoot the problem.

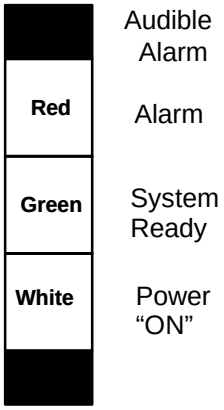
The Sensor Failure Alarm can indicate either a sensor open or a sensor short. Sensor open is accompanied by a blinking up arrow on the actual temperatures display screen. Sensor short is accompanied by a blinking down arrow. Press F4 to reset the error message and then either a. manually turn the zone OFF (via Setpoints F1/ indicated zone/ On/Off F3), or b. troubleshoot the problem.



The Hopper Overtemp Alarm indicates that adhesive temperatures in the ASU's hopper have exceeded the setting of the mechanical (redundant) thermostat. Press F4 and troubleshoot the problem.

The Communication Error Alarm indicates an internal failure, unrelated to zone temperatures. Call ITW Dynatec for assistance.

Optional System Status Lights



This tri-color stack light eases remote monitoring of the system's status. The lower, white light illuminates when the system is turned ON. The middle, green light indicates that the system has warmed up to temperature setpoints ("ready"). The upper, red light illuminates only in an alarm condition and is accompanied by an audible alarm. The audible alarm is housed within the upper (black) section of the stack.

The status lights may be wired to indicate either high/low temperature, low adhesive level or open/short sensor. See Chapter 11 for wiring diagram.

Settings for a Typical Operation

Note: The values given here are approximate settings for a typical packaging operation. The values you choose will be based on the type of equipment and adhesive you are using and the nature of your particular operation.

If Application Temperature is 177°C (350°F):

- Hose and head temperature: 177°C (350°F).
- Hopper setpoint temperature: 163°C (325°F).
- Hi/ Lo limit deviation: 12°C (20°F).
- ASU operating range: 149°C to 177°C (300°F to 350°F).
- Standby condition temperature (deviation): 30°C (50°F).
- Hopper over-temperature setpoint : 177°C (350°F)
- Mechanical thermostat (for the hopper) over-temperature: 219°C (425°F)

For most operations, temperature fluctuations will be very small and of short duration. For these reasons, the settings above are recommended.

System Values That Are Factory Programmed (not customer programmable)

- Minimum setpoint value: 10°C (50°F).
- Maximum setpoint value (Setpoint limitation): 218°C (425°F).
  " " " for high temp mode enabled ASUs: 232°C (450°F)
- Maximum alarm deviation: 50° (C or F).
- Minimum alarm deviation: 5° (C or F).
- Maximum standby temperature: 150° (C or F) less than setpoint.
- Minimum standby temperature: 30° (C or F) less than setpoint.
- "Actual" temperature indication range: 0°C to 260°C (32°F to 500°F).

Customer Programmable Values Preset At The Factory

ITW Dynatec can set the controller's system values to customer's specs, if provided.

If customer's specs are not provided, the following values will be entered into the DynaControl controller at the factory. They may be changed by reprogramming through the keypad. (These are not the "default" settings, see following section).

- Applicator (head) and hose setpoints: varies from 138 to 149°C (280 to 300°F).
- Hopper setpoint: 143°C (290°F).
- All zones are switched off, except for the hopper and the optional drop-in grid.
- Motor rpm: 0 in the "OFF" mode.
- Standby: 80°C (140°F) under setpoint.
- Hi and low alarms: ± 12°C (20°F) from setpoint.
- Pump enable temperature: 132°C (270°F).

Default Settings of the DynaControl Controller

Default settings are the manufacturer's preset values to which the system will return if the Dyna-Control is subjected to an internal memory reset (also referred to as a "re-boot"). While you can change your programmed values to anything within the system's limits, the default settings cannot be changed.

Defaults

- Language: English
- Setting for Customer Access Code: "9999".
- Temperature setpoint for each zone: - - -
- Hopper ready temperature: 135°C (270°F).
- Over-temperature limit: Your chosen setpoint limitation + 10° C or F.
  For example: if your setpoint limitation is 218°C (425°F), then your over-temp limit = 228°C (435°F).
- Standby temperature for all zones: 80°C (140°F) lower than programmed setpoints.
- Hi/ lo limit deviation for all temperature zones: ± 20°C (36°F).
- Temperature zone offset: 0°C (0°F).
- Sequential heating: first hopper zones, then hose/ head zones and auxiliary zones.
- Setpoint limitation: 218°C (425°F).
- Minimum pump speed: 0% of full speed.
- Maximum pump speed: 100% of full speed.
- Proportional Integral values (P-I values): for Premelt, Hopper and Filterblock temperature zones, P = 15 and I = 3. For all other zones, P = 12 and I = 2

Helpful Tips for the User

- When the ASU is turned ON, all temperature setpoints and other operating parameters will be exactly where they were when the ASU was turned off.

- When the ASU is turned ON, all system heaters go ON if the automatic heater startup is enabled and if setpoints are programmed unless sequential heatups have been set. However, if hopper temperature is above ready temperature when the ASU is turned ON, all hose and head sequential heatups will be bypassed and hoses and heads will be turned ON.

- If the system is turned OFF and then ON again, the standby condition will be disabled.

Serial Protocol for RS232 and RS485 Options, V5.00 d & up

Specifications

- RS232C, no handshake
- RS485, 4 wires
- baud rate 1200…57600 baud
- character format 8 databits + 1 startbit + 1 stopbit
- parity: no parity check

General information

- DynaControl is always slave. The controller is only reacting when addressed by a master.
- DynaControl is only responding when own slave address is received.
  Slave address is programmable via front panel (PC-LINK Setup).
- Multi-digit values are transferred most significant digit first, each digit is ASCII coded.
- Used control characters:

STX	02	Start of Text
ETX	03	End of Text
EOT	04	End of Transmission
ENQ	05	Enquiry
ACK	06	Positive Acknowledge
NAK	15	Negative Acknowledge

Structure of commands

- Master transmits to DynaControl:
  EOT, addr, opcode, 0..n data bytes, ENQ
- DynaControl responds:
  STX, 1...n data bytes, ETX

Address Setting

Each telegram sent to the DynaControl contains the slave address.
DynaControl is only responding if the received address matches the programmable address.

Examples:
Controller address = 37

1. Write temperature setpoints

Zone 3 = 250_F
Zone 4 = 280_F
Zone 5 = 300_F
Zone 6 = 350_F, but temporarily not in use

EOT , 3 , 7 , F , 0 , 3 , 0 , 2 , 5 , 0 , 0 , 2 , 8 , 0 , 0 , 3 , 0 , 0 , 1 , 3 , 5 , 0 , ENQ
| 37 | | 3 | 250 | 280 | 300 | 350 / Off |

note: adding 1000 to the setpoint will deactivate this zone.

2. Read actual temperatures

EOT , 3 , 7 , d , 0 , 0, ENQ
| 37 | | 00 |

note: zone number 00 will request information of all available zones

Return String:
STX , 0 , 2 , 3 , 5 , 0 , 2 , 4 , 4 , 1 , 9 , 9 , 9 0 , 2 , 3 , 5 …….ETX
-> zone 1 is 235_F, zone 2 is 244_F , zone 3 has no sensor attached ….

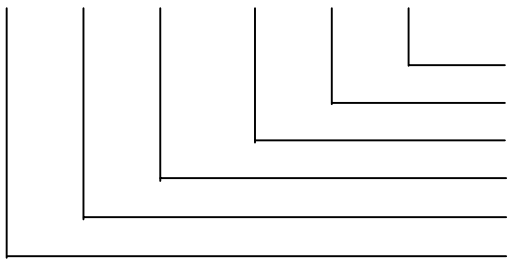
Note: 1999 indicates open sensor,0999 indicates sensor short circuit

3. Read actual pump speed
EOT , 3 , 7, e , 0 , 0 , ENQ request the speed of all pumps
Return String:
STX , 0 , 8, 5 , 0 , 0 , 6 , 6 , 4 , ETX
-> System has 2 pumps, pump1: 85.0Rpm, pump2: 66.4Rpm

4. Read System Status
EOT, 3 , 7 , f , ENQ
Return String:
STX , F , ETX -> 'F' = 46hex

Bit wise: 0_7 1_6 0_5 0_4 0_3 1_2 1_1 0_0

Always!



No setback, normal mode
Controller is on
Enable thermostat closed
Hopper not empty
No low temper.
No high temper.
= Ready

5. Read status of all temperature zones
EOT , 3 , 7 , l , 0 , 0 , ENQ
Return String:
STX , 0 , 2 , 2 , 3 , 1 , 1 , 7, 7, …….ETX
è zone 1: is not used (0)
è zone 2&3: heating, but below setpoint window (2)
è zone 4:heating and ready (3)
è zone 5&6: waiting due to heat up sequence (1)
è zone 7&8: no sensor attached (7)

cont.

ITW Dynatec
Adhesive Application Systems

DynaControl Version V5M Serial Protocol

Version: V5.00e
Date: 09.27.01

Opcode	Parameter Syntax*	Return String	Function	Option
0x41 / 'A'	zz.n*dddd	ACK / NAK	write temperature setpoints °C (10 to 232) , will switch to Celsius	1 zone / multiple zones
0x46 / 'F'	zz.n*dddd	ACK / NAK	write temperature setpoints °F (50 to 450), will switch to Fahrenheit	1 zone / multiple zones
0x61 / 'a'	zz	dddd (n*dddd)	read temperature setpoints	1 zone / all zones
0x64 / 'd'	zz	dddd (n*dddd)	read actual temperature (1999 = open sensor, 0999 = shorted sensor)	1 zone / all zones
0x42 / 'B'	zz.n*dd	ACK / NAK	write temperature tolerance window (5 to 50 degree)	1 zone / multiple zones
0x62 / 'b'	zz	dd (n*dd)	read temperature tolerance window	1 zone / all zones
0x43 / 'C'	zz.n*dddd	ACK / NAK	write pump speed setpoint (0.0 to 100.0%)	1 pump / multiple pumps
0x63 / 'c'	zz	dddd (n*dddd)	read pump speed setpoint (0.0 to 100.0%)	1 pump / all pumps
0x65 / 'e'	zz	dddd (n*dddd)	read actual pump speed (0.0 to 150.0 Rpm)	1 pump / all pumps
0x6c / 'l'	zz	dddd (n*dddd)	read line speed input (0.0 to 100.0%)	1 pump / all pumps
0x67 / 'g'	zz	dddd (n*dddd)	read pressure transducer (0.0 to 150.0BAR / 0 to 1500PSI, 2000= open transd.)	1 transducer / all transd.
0x50 / 'P'	zz.n*dddd	ACK / NAK	write pressure alarm value (0.0 to 150.0BAR / 0 to 1500PSI	1 transd. / multiple transd.
0x70 / 'p'	zz	dddd (n*dddd)	read pressure alarm value (0.0 to 150.0BAR / 0 to 1500PSI)	1 transducer / all transd.
0x4d / 'M'	zz.n*d	ACK / NAK	write pump mode ('S'=Stop, 'M'=Manual, 'A'=Automatic)	1 pump / multiple pumps
0x6d / 'm'	zz	n*d	read pump mode ('S'=Stop, 'M'=Manual, 'A'=Automatic)	1 pump / all pumps
0x66 / 'f'	n.a.	sys-data 1	read system status 1 (see note 1)	
0x6a / 'j'	n.a.	sys-data 2	read system status 2 (see note 2)	
0x69 / 'i'	zz	n*d	read status of temperature zone (see note 3)	1 zone / all zones
0x48 / 'H'	d	ACK	set system mode (see note 4)	
0x52 / 'R'	d	ACK / NAK	set active program number (1 to 4)	
0x72 / 'r'	n.a.	d	read active program number (1 to 4)	
0x4c / 'L'	n.a.	ACK / NAK	reset error message	

*1: System status: Bit0=Setback active, Bit1=Controller on, Bit2= Enable thermostat active, Bit3= Low Level, Bit4= Low Temp.,Bit5=High,Temp., Bit6= always 1

*2: System status: Bit0= scheduler avtive, Bit6= always 1

*3: Zone status: 0=off, 1=wait, 2= heat up, 3= ready, 4= low temp., 5= high temp. , 6= sensor short circuit, 7= sensor open

*4: System mode: Bit0= SetbackOn/Off, Bit1= Heat up sequence yes/no, Bit2= Scheduler active yes/no, Bit3= controller On/Off

*: zz: zone number 01 to max. or 00 for all zones, dddd: four digit data, dd: two digit data, d: one digit data or character

PN 112224 M Series DynaControl EtherNet/IP Adapter Option, V1.06

General

This optional adapter provides an EtherNet/IP connection for Dynamelt M Series hot melt ASUs. This connection makes it possible to monitor and control the basic functions of the hot melt unit from a remote PLC or PC.

This adapter uses an ODVA approved module. In order to fully operate, the Dynamelt M must be equipped with firmware rev. V5.15M or later.

Basic Features:

- 10/100 Mbit/s
- DHCP/BootP
- Access to basic process parameters
- Local and remote access
- Watchdog signal

Installing the EtherNet/IP-Adapter in a ControlLogix5000 System

These installation steps assume that RSLogix5000 and ControlLogix5000 with an EtherNet/IP module/bridge (1756 ENBT or similar) are set up and working properly.

1. Connect the Dynatec Hot melt unit (ASU) to the Ethernet network using a standard RJ45-cable.

2. Start RsLogix5000 with a new or existing project. Set to "Offline" mode.

3. ***Add the EtherNet/IP-Adapter to the PLC Configuration:***
   - Start by right clicking the EtherNet/IP module/bridge in the configuration
   - Select "New Module"
   - Select "Generic Ethernet Module"
   - Press *OK*
4. ***Configure the EtherNet/IP-Adapter:***
   - Enter the name of the module. (for example "Dynatec_Melter". If you desire to import the controller tags provided on the CD-ROM, the module name must be exactly "Dynatec_Melter". See step #6 following).
   - Set *Comm Format* to "Data-INT", since all data are 16-bit words
   - Set *Connection Parameter Assembly* Instance to 100 for Input and 150 for Output
   - Set Size for 180 input/ 80 output (16 bit)
   - Set the *Configuration Instance* to 1 but the size to 0 since this instance is not supported
   - Set the IP-Address to 192.168.23.180. For more details about IP-Address see the following section, "Changing the IP-Address"
   - Press *Next >*
   - On next dialog, select *Requested Packet Interval: 100ms*
   - Do not Inhibit Module
   - Press *Finish >>*. On the main screen you should see the ETHERNET-MODULE under the I/O Configuration
   - Select " Go Online" from the "Communications" menu
   - Select " Download" in the next window
   - Confirm the Download

5. Checking the I/O Tags

After successful configuration of the EtherNet/IP-Adapter, it is possible to access the input/output data. There are three Controller Tags: "Dynatec Melter: C", "Dynatec Melter: I" and "Dynatec Melter: O". The input/output tags consist of 180/ 80 words each.

"Dynatec Melter: C" is the configuration tag (not used).

"Dynatec Melter: I" is the data coming from the Dynatec hot melt unit

"Dynatec Melter :O" holds the data going to the hot melt unit.

The definitions of the data tags are explained on the last pages of this section.

6. Importing Controller Tags

The CD-ROM that is provided with the EtherNet/IP option contains a pre-defined controller tag table. In order to save time, this table may be imported.

- In the RSLogix5000 go offline
- Select Tools -> Import Tags
- Select the "Dynatec-Controller-Tags_DMM. CSV" from the CD-ROM
- Click Import
- If the import was successful, the Report Window in the lower part of the screen should indicate 242 imported tags.
- Go online again
- Go back to the controller tag screen and verify the tags.

Details on the Communication

General Information

The In- and Out- data table (Controller Tags) contain all parameters for a maximum equipped hot melt machine. In most of the cases, only parts of the parameters are needed.

The temperature zones are logically organized, first all premelt zones, progmelt zones (= hopper), then filter blocks up to the auxiliary zones. The number of actually available zones depends on the type of machine.

- Setting LocalAccessTemps to 1 allows the user to make changes to the temperature setpoints on the hotmelt unit. The PLC can read the changes from the corresponding IN-words but the temperatures in the OUT area will not be effective on the hot melt unit.

- Setting LocalAccessTemps to 0 switches the control back to PLC control. All temperature OUT-words will be transferred to the hot melt unit. A local change of temperature setpoints is not possible since the PLC will instantly overwrite the entry.

- LocalAccessMotors controls the access to pump settings analog to the description above.

- After a local change of setpoints, the PLC first must read the new setpoints before switching back to PLC control.

- It is not possible to deactivate a temperature zone locally on the hot melt unit since the PLC always sends the ZoneEnable/Disable information.

Zones Enabling/Disabling

Temperature zones that are temporarily not used can be remotely deactivated by setting a corresponding value to OUT-word 70 to 75. Each bit of this word represents one temperature zone. Bit0 = zone1, Bit1 = zone2 etc. Setting the bit will activate the zone. Resetting will deactivate the zone.

Pump Control

There are several ways to control pump speed:

1. Manual Mode: the pump speed can be programmed locally on the hot melt machine. In order to allow this mode, the OUT-word 50 (for pump 1) must be set to 77

(ASCII “M”). Local Access PUMP (OUT-word 63) does not have to be set.

2. Automatic Mode: the pump speed is controlled via a 0 to 10V signal, connected to the hot melt machine. In order to activate this mode, the OUT-word 50 (for pump 1) must be set to 65 (ASCII “A”).
The pump speed, which follows the line speed can be read in IN-word 134 (for pump 1). This value shows 0.1% resolution.

3. Stop Mode: The pump is stopped.

4. Bus Mode: the pump speed is controlled via OUT-word 56 (for pump 1). Out-word 50 (for pump 1) must be set to 66 (ASCII “B”). On the keypad of the hot melt machine, the pump speed can be fine tuned by using the min. and max. scaling, similar to the Automatic Mode.
The speed setting must be transmitted in increments of 0.1% (0 to 1000 = 0.0 to 100.0%).

Adhesive Level Indication

Word 142/ 143 (142 = single hopper/ 142 & 143 = dual hopper) shows the state of the optional adhesive level control. A 0 indicates the level is O.K. and a 1 indicates a low-level situation. This signal is an instantaneous non-latched indication.

In order to avoid local low-level indications, which have to be reset on the keypad, the low-level detection should be disabled in the customer set-up menu of the Dynamelt M hot melt unit.

Zone Status Indication

The status of all temperature zones can be read in IN-word 146 to 175. This information is bit-wise coded and organized in zone type.

Examples:

IN-word 146:	0003h	0 0 0 0 . 0 0 0 0 . 0 0 0 0 . 0 0 0 0 . 0 0 1 1	premelt 1& 2 are switched ON
IN-word 150:	003Fh	0 0 0 0 . 0 0 0 0 . 0 0 0 0 .0 0 1 1 .1 1 1 1	6 heads are switched ON
IN-word 156:	003Fh	0 0 0 0 . 0 0 0 0 . 0 0 0 0 . 0 0 0 0 . 1 1 1 1	4 heads are in waiting position
IN-word 159:	0001h	0 0 0 0 . 0 0 0 0 . 0 0 0 0 . 0 0 0 0 . 0 0 0 1	the progmelt (hopper) is heating
IN-word 167:	0020h	0 0 0 0 . 0 0 0 0 . 0 0 0 0 .0 0 1 0 .0 0 0 0	hose 6 is ready
IN-word 175:	0011h	0 0 0 0 . 0 0 0 0 . 0 0 0 0 . 0 0 0 1 .0 0 0 1	auxiliary zones 1 & 5 show alarm

Identification Word

OUT-word 79 is used as an identification word. This word must be set to a certain value to validate the communication. If this word is set differently, the hot melt unit will not accept the OUT area although the IN-area will show proper values. Dynamelt M hot melt units require ID-word set to 68.

Examples for a typical communication

Initializing:	Set OUT 76 to 1 :	Switches the controller on
	Set OUT 79 to 68 :	Identifies the communication
	Set OUT 77 to 0 :	No standby, normal mode

4-Hose Operation:	Set OUT 73 to 15 :	Hoses 1 to 4 are switched ON
	Set OUT 74 to 15 :	Heads 1 to 4 are switched ON
6-Hose Operation:	Set OUT 73 to 63 :	Hoses 1 to 6 are switched ON
	Set OUT 74 to 63 :	Heads 1 to 6 are switched ON

Check Ready Condition:	Compare IN 146 with 164	
	Compare IN 147 with 165	
	Compare IN 148 with 166	
	Compare IN 149 with 167	
	Compare IN 150 with 168	
	Compare IN 151 with 169:	If all comparisons are equal, the system is ready
Check Alarm Condition:	Read In 170 to 175	If any word does not equal 0, an alarm is present

Changing the IP-Address

The EtherNet/IP-Adapter will be factory set to 192.168.23.180 but the DHCP/BOOTP function is enabled. That means the module will request a new IP-address after power up. If this request is not serviced, the old IP-address will be valid.

There are several ways to change the IP-address. In any case, a PC must be connected to the module, either directly via crossover cable or via hub/switch to the network with the module.

Configuration Program 'Anybus IPconfig'

On the EtherNet/IP support disc you will find a configuration tool to change the IP-Address. Start the Anybus IPconfig installation program. Follow the instructions on the screen.

Once the configuration tool is running, press the scan button to search for any Dynatec-EtherNet/IP modules. If a module is detected, it will show up in the window. Double clicking on it will allow changing the settings for this Module.

Using the Configuration File

The file ethcfg.cfg can be used to change the IP-address. This method is possible only if the actual IP-address is known (e.g. the factory set 192.168.23.180), See also section "Configuration File".

- Open a FTP connection to the module (e.g. Windows Explorer™ FTP://192.168.23.180)
- Locate the ethcfg.cfg
- Copy this file to a folder on your PC
- Open the file with any text editor
- Change the IP-address
- Save the file using the same name
- Copy the file back to the module
- Re-cycle power on the module (hot melt unit)

Note: If the configuration file ethcfg.cfg is not found, the module will automatically activate a DHCP/BOOTP request.

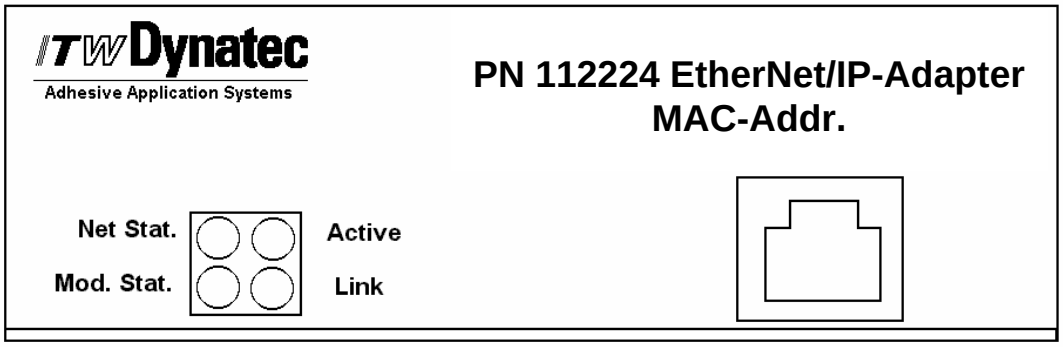
Using the BootP-Server Function

The BOOTP-Server comes with the RSLinx Tools of the Rockwell Automation™ Software or can be downloaded as a stand-alone application. Version V2.3.2 or newer allows to change the IP-address of the EtherNet/IP module.

Note: The EtherNet/IP module only requests an IP-address assignment for approx. 30 sec.

If this request is not serviced within this time (by entering the desired IP-address in the relation list) the module's power (hot melt machine) must be re-cycled.

Diagnostic LED's



1. Net Stat. = Network Status

State	Summary	Description
Steady Off	No power or no IP address	The module has no power or no IP address has been assigned.
Steady Green	Connected	The module has at least one established EtherNet/IP connection.
Flashing Green	No connections	There are no EtherNet/IP connections established to the module.
Flashing Red	Connection Timeout	One or more of the connections in which this module is the target has timed out. This state is only left if all timed out connections are re-established or if the module is reset.
Steady Red	Duplicate IP Address	The module has detected that its IP address is already in use
Flashing Green/Red	Self-Test	The module is performing a power on self test

2. Active

This led flashes green each time a packet is received or transmitted.

3. Mod. Stat. = Module Status

State	Summary	Description
Steady Off	No power	The module has no power.
Steady Green	Device operational	The module is operating correctly.
Flashing Green	Standby	The module has not been configured.
Flashing Red	Minor Fault	A minor recoverable fault has been detected
Steady Red	Major Fault	A major internal fault has been detected
Flashing Green/Red	Self-Test	The module is performing a power on self test

4. Link = Link Activity

Color	State	Description
Green	On	The module has a link
	Off	The module does not sense a link

Configuration File

The EtherNet/IP module contains a file (ethcfg.cfg) that is read by the module at start up. This file defines the network properties of the module. Any text editor can be used to edit the parameters.

Note: It is very important to follow the exact syntax specification, otherwise the module might have problems interpreting it, which can result in a faulty or non-expected behavior.

The file can be uploaded and after modification, downloaded using the FTP function.
(e.g. open a Windows Explorer window. Type 'FTP://192.168.23.180')

The format of the file is shown as follows:

FORMAT	EXPLANATION
[IP address]	**IP Address**
192.168.23.180	
[Subnet mask]	**Subnet mask**
255.255.255.0	
[Gateway address]	**Gateway address**
0.0.0.	
[DHCP/BOOTP]	**DHCP/BootP**
ON	**ON** - Enabled
	OFF – Disabled
[SPEED]	**Speed**
Auto	**Auto** – Default. Auto Negotiation will be used.
	100 – Forces the module to operate at 100Mbit/s only
	10 – Forces the module to operate at 10Mbit/s only

FORMAT	EXPLANATION
[Duplex]	**Duplex**
Auto	**Auto** – Default. Auto negotiation will be used.
	Full – Forces the module to operate at full duplex only
	Half - Forces the module to operate at half duplex only
[SMTP address]	**SMTP server/ login settings**
0.0.0.0	
[SMTP username]	**SMTP server/ login settings**
username	
[SMTP password]	**SMTP server/ login settings**
password	
[DNS1 address]	**Primary and Secondary DNS**
0.0.0.0	
[DNS2 address]	**Primary and Secondary DNS**
0.0.0.0	
[Domain name]	**Domain Name (Optional)**
hms.se	
[Host name]	**Host Name (Optional)**

Word Address	Function	Zone Name	Valid Range
0	Reserved		
1	Reserved		
2	Setpoint Premelt 1		100°F - 425°F
3	Setpoint Premelt 2		
4	Setpoint Premelt 3		
5	Setpoint Premelt 4		
6	Setpoint Premelt 5		
7	Setpoint Premelt 6		
8	Setpoint Progmelt 1		
9	Setpoint Progmelt 2		
10	Setpoint Progmelt 3		
11	Setpoint Filterblock 1		
12	Setpoint Filterblock 2		
13	Setpoint Filterblock 3		
14	Setpoint Hose 1		
15	Setpoint Hose 2		
16	Setpoint Hose 3		
17	Setpoint Hose 4		
18	Setpoint Hose 5		
19	Setpoint Hose 6		
20	Setpoint Hose 7		
21	Setpoint Hose 8		
22	Setpoint Hose 9		
23	Setpoint Hose 10		
24	Setpoint Hose 11		
25	Setpoint Hose 12		
26	Setpoint Head 1		
27	Setpoint Head 2		
28	Setpoint Head 3		
29	Setpoint Head 4		
30	Setpoint Head 5		
31	Setpoint Head 6		
32	Setpoint Head 7		
33	Setpoint Head 8		
34	Setpoint Head 9		
35	Setpoint Head 10		
36	Setpoint Head 11		
37	Setpoint Head 12		
38	Setpoint Auxiliary 1		
39	Setpoint Auxiliary 2		
40	Setpoint Auxiliary 3		
41	Setpoint Auxiliary 4		
42	Setpoint Auxiliary 5		
43	Setpoint Auxiliary 6		
44	Setpoint Auxiliary 7		
45	Setpoint Auxiliary 8		
46	Setpoint Auxiliary 9		
47	Setpoint Auxiliary 10		
48	Setpoint Auxiliary 11		
49	Setpoint Auxiliary 12		
50	Motor Mode 1		S' (83) = Stop 'M' (77) = Manual (Local manual speed) 'A' (65) = Auto (0 to 10V) 'B' (66) = Bus (EtherNet/IP: OUT 56 to 61)
51	Motor Mode 2		
52	Motor Mode 3		
53	Motor Mode 4		
54	Motor Mode 5		
55	Motor Mode 6		
56	Motor Speed 1		0 to 1000 = 0.0 to 100.0% [500 = 50.0%] (Local manual speed)
57	Motor Speed 2		
58	Motor Speed 3		
59	Motor Speed 4		
60	Motor Speed 5		
61	Motor Speed 6		

Word Address	Function	Zone Name	Valid Range
62	Pressure Channel 1		0 to 1500 PSI (requires digital pressure readout option)
63	Pressure Channel 2		
64	Pressure Channel 3		
65	Pressure Channel 4		
66	Pressure Channel 5		
67	Pressure Channel 6		
68	Pressure Channel 7		
69	Pressure Channel 8		
70	Pressure Channel 9		
71	Pressure Channel 10		
72	Pressure Channel 11		
73	Pressure Channel 12		
74			
75			
76			
77			
78			
79			
80	Actual Temp. Premelt 1		0 to 500°F (1999 = open sensor / 999 = shorted sensor)
81	Actual Temp. Premelt 2		
82	Actual Temp. Premelt 3		
83	Actual Temp. Premelt 4		
84	Actual Temp. Premelt 5		
85	Actual Temp. Premelt 6		
86	Actual Temp. Progmelt 1		
87	Actual Temp. Progmelt 2		
88	Actual Temp. Progmelt 3		
89	Actual Temp. Filterblock 1		
90	Actual Temp. Filterblock 2		
91	Actual Temp. Filterblock 3		
92	Actual Temp. Hose 1		
93	Actual Temp. Hose 2		
94	Actual Temp. Hose 3		
95	Actual Temp. Hose 4		
96	Actual Temp. Hose 5		
97	Actual Temp. Hose 6		
98	Actual Temp. Hose 7		
99	Actual Temp. Hose 8		
100	Actual Temp. Hose 9		
101	Actual Temp. Hose 10		
102	Actual Temp. Hose 11		
103	Actual Temp. Hose 12		
104	Actual Temp. Head 1		
105	Actual Temp. Head 2		
106	Actual Temp. Head 3		
107	Actual Temp. Head 4		
108	Actual Temp. Head 5		
109	Actual Temp. Head 6		
110	Actual Temp. Head 7		
111	Actual Temp. Head 8		
112	Actual Temp. Head 9		
113	Actual Temp. Head 10		
114	Actual Temp. Head 11		
115	Actual Temp. Head 12		
116	Actual Temp. Auxiliary 1		
117	Actual Temp. Auxiliary 2		
118	Actual Temp. Auxiliary 3		
119	Actual Temp. Auxiliary 4		
120	Actual Temp. Auxiliary 5		
121	Actual Temp. Auxiliary 6		
122	Actual Temp. Auxiliary 7		
123	Actual Temp. Auxiliary 8		

Word Address	Function	Zone Name	Valid Range	
124	Actual Temp. Auxiliary 9			
125	Actual Temp. Auxiliary 10			
126	Actual Temp. Auxiliary 11			
127	Actual Temp. Auxiliary 12			
128	Actual Pump Speed 1		0 to 1500 = 0.0 to 150.0 RPM (requires RPM readout option)	
129	Actual Pump Speed 2			
130	Actual Pump Speed 3			
131	Actual Pump Speed 4			
132	Actual Pump Speed 5			
133	Actual Pump Speed 6			
134	Line Speed 1		0-1000 = 0 to 100.0% (0 to 10V)	
135	Line Speed 2			
136	Line Speed 3			
137	Line Speed 4			
138	Line Speed 5			
139	Line Speed 6			
140	Controller ON/OFF		0 = Controller is OFF / 1 = Controller is ON	
141	Standby ON/OFF		0 = Normal Mode / 1 = Standby is active	
142	Adhes. Level Status 1		0 = Level is OK / 1 = Level is low (requires level control option)	
143	Adhes. Level Status 2			
144				
145				
146	Premelts On/Off	Each zone is represented by the corresponding bit in these words	Bit0 to Bit 5	0 = Zone is OFF / 1 = Zone is ON
147	Progmelts On/Off		Bit0 to Bit2	
148	Filterblocks On/Off		Bit0 to Bit2	
149	Hoses On/Off		Bit0 to Bit11	
150	Heads On/Off		Bit0 to Bit11	
151	Aux. Zones On/Off		Bit0 to Bit11	
152	Premelts Waiting		0 = Zone is not waiting / 1 = Zone is waiting	
153	Progmelts Waiting			
154	Filterblocks Waiting			
155	Hoses Waiting			
156	Heads Waiting			
157	Aux. Zones Waiting			
158	Premelts Heating		0 = Zone is not heating / 1 = Zone is heating	
159	Progmelts Heating			
160	Filterblocks Heating			
161	Hoses Heating			
162	Heads Heating			
163	Aux. Zones Heating			
164	Premelts Ready		0 = Zone is not ready/ 1 = Zone is ready	
165	Progmelts Ready			
166	Filterblocks Ready			
167	Hoses Ready			
168	Heads Ready			
169	Aux. Zones Ready			
170	Premelts Alarm		0 = Zone has no alarm / 1 = Zone has alarm	
171	Progmelts Alarm			
172	Filterblocks Alarm			
173	Hoses Alarm			
174	Heads Alarm			
175	Aux. Zones Alarm			
176				
177				
178				
179	Watchdog		Signal toggles every 0.5sec. (0/1)	

Word Address	Function	Zone Name	Valid Range
0	Reserved		
1	Reserved		
2	Setpoint Premelt 1		
3	Setpoint Premelt 2		
4	Setpoint Premelt 3		
5	Setpoint Premelt 4		
6	Setpoint Premelt 5		
7	Setpoint Premelt 6		
8	Setpoint Progmelt 1		
9	Setpoint Progmelt 2		
10	Setpoint Progmelt 3		
11	Setpoint Filterblock 1		
12	Setpoint Filterblock 2		
13	Setpoint Filterblock 3		
14	Setpoint Hose 1		
15	Setpoint Hose 2		
16	Setpoint Hose 3		
17	Setpoint Hose 4		
18	Setpoint Hose 5		
19	Setpoint Hose 6		
20	Setpoint Hose 7		
21	Setpoint Hose 8		
22	Setpoint Hose 9		
23	Setpoint Hose 10		
24	Setpoint Hose 11		
25	Setpoint Hose 12		100°F - 425°F
26	Setpoint Head 1		only active if Local Access Temps. O.Data[62] is set to 0
27	Setpoint Head 2		
28	Setpoint Head 3		
29	Setpoint Head 4		
30	Setpoint Head 5		
31	Setpoint Head 6		
32	Setpoint Head 7		
33	Setpoint Head 8		
34	Setpoint Head 9		
35	Setpoint Head 10		
36	Setpoint Head 11		
37	Setpoint Head 12		
38	Setpoint Auxiliary 1		
39	Setpoint Auxiliary 2		
40	Setpoint Auxiliary 3		
41	Setpoint Auxiliary 4		
42	Setpoint Auxiliary 5		
43	Setpoint Auxiliary 6		
44	Setpoint Auxiliary 7		
45	Setpoint Auxiliary 8		
46	Setpoint Auxiliary 9		
47	Setpoint Auxiliary 10		
48	Setpoint Auxiliary 11		
49	Setpoint Auxiliary 12		
50	Pump Mode 1		
51	Pump Mode 2		S' (83) = Stop
52	Pump Mode 3		'M' (77) = Manual (Local manual speed)
53	Pump Mode 4		'A' (65) = Auto (0 to 10V)
54	Pump Mode 5		'B' (66) = Bus (EtherNet/IP: OUT 56 to 61)
55	Pump Mode 6		
56	Set Speed Pump 1		
57	Set Speed Pump 2		
58	Set Speed Pump 3		0 to 1000 = 0.0 to 100.0% [500 = 50.0%]
59	Set Speed Pump 4		only active when pump in in Bus-Mode
60	Set Speed Pump 5		
61	Set Speed Pump 6		

Word Address	Function	Zone Name	Valid Range	
62	Local Access Temps.	all temp. zones	set to 1 enables setpoint changes on keypad	set
63	Local Access Pumps	all pumps	to 0 enables setpoint changes via EtherNet/IP	
64				
65				
66				
67				
68				
69				
70	Premelts On/Off	Each zone is represented by the corresponding bit in these words	Bit0 to Bit 5	each bit: 1 = zone enabled
71	Progmelts On/Off		Bit0 to Bit2	
72	Filterblocks On/Off		Bit0 to Bit2	
73	Hoses On/Off		Bit0 to Bit11	
74	Heads On/Off		Bit0 to Bit11	
75	Aux. Zones On/Off		Bit0 to Bit11	
76	Controller ON/OFF		set to 0 to switch off / set to 1 to switch on	
77	Standby ON/OFF		set to o for normal mode / set to 1 for standby mode	
78				
79	Identification Word		DM-M: 68, has to be set to validate communication	

Chapter 5
PROGRAMMING INSTRUCTIONS
FOR DynaControl™ CONTROLLER WITH EXPANDED KEYPAD V.5.00c & UP

Controller Safety Consideration

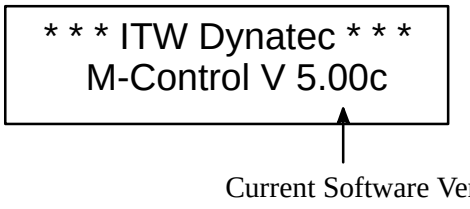
DANGER HIGH VOLTAGE

Never open the control panel without switching off the main disconnect switch to ensure that it is disconnected from its power source.

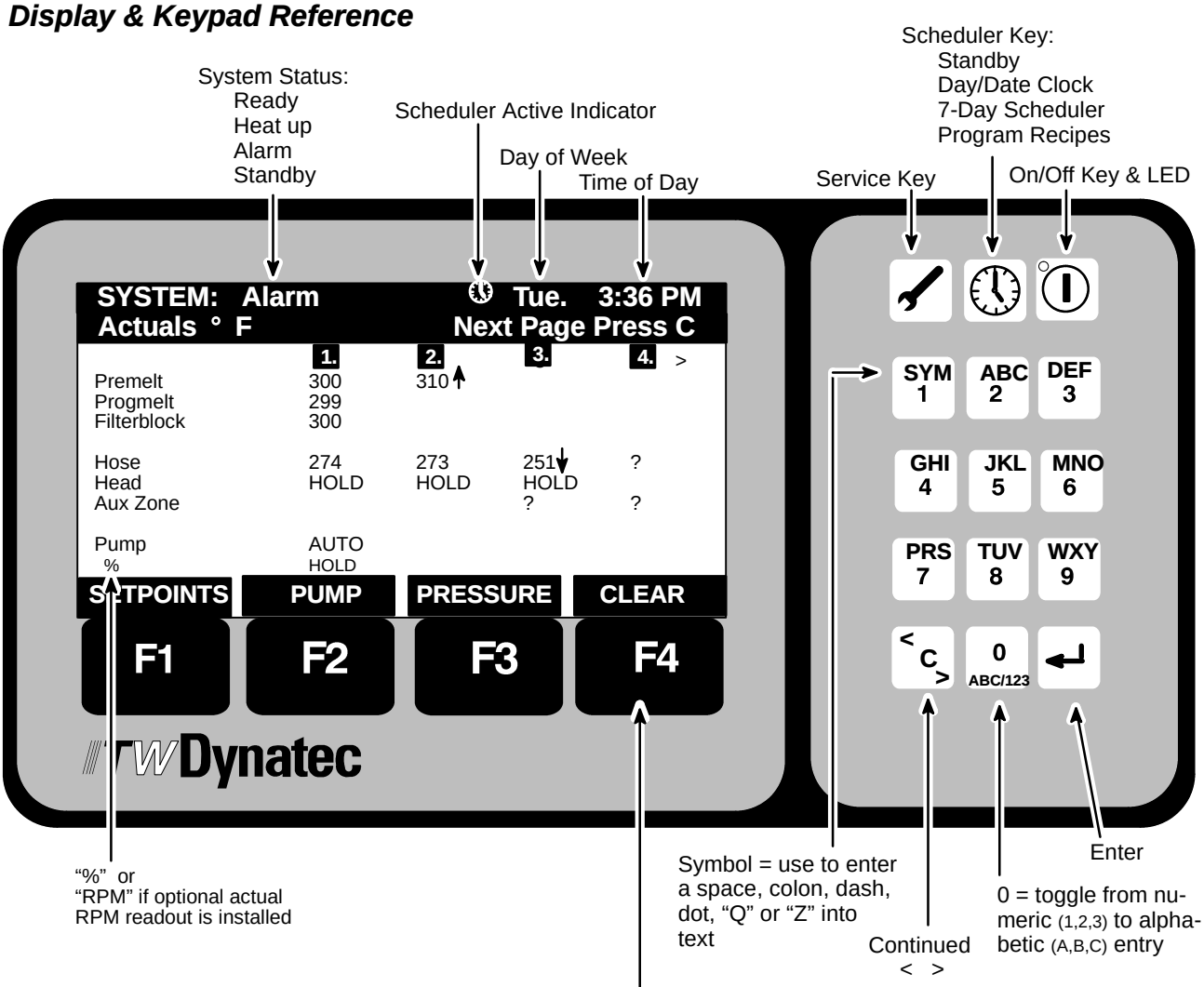
The printed circuit boards should always be carefully removed. DO NOT handle the boards except by their edges. Read the section on PCBs in Chapter 7 of this manual for further cautions.

Software Version

You can determine the software version of your controller by noting it when it comes up on the Help Screen or on the display at startup:

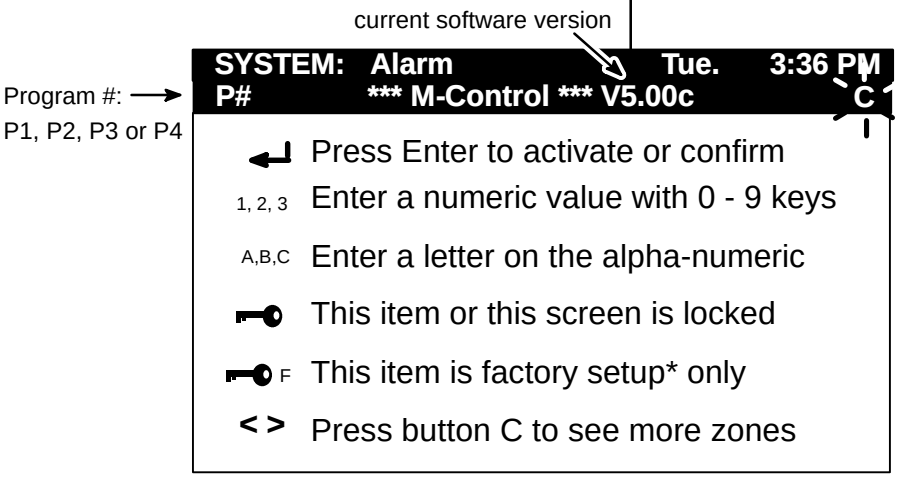


Display & Keypad Reference



Display & Function Keypad
(Actual Temps Screen shown as example)

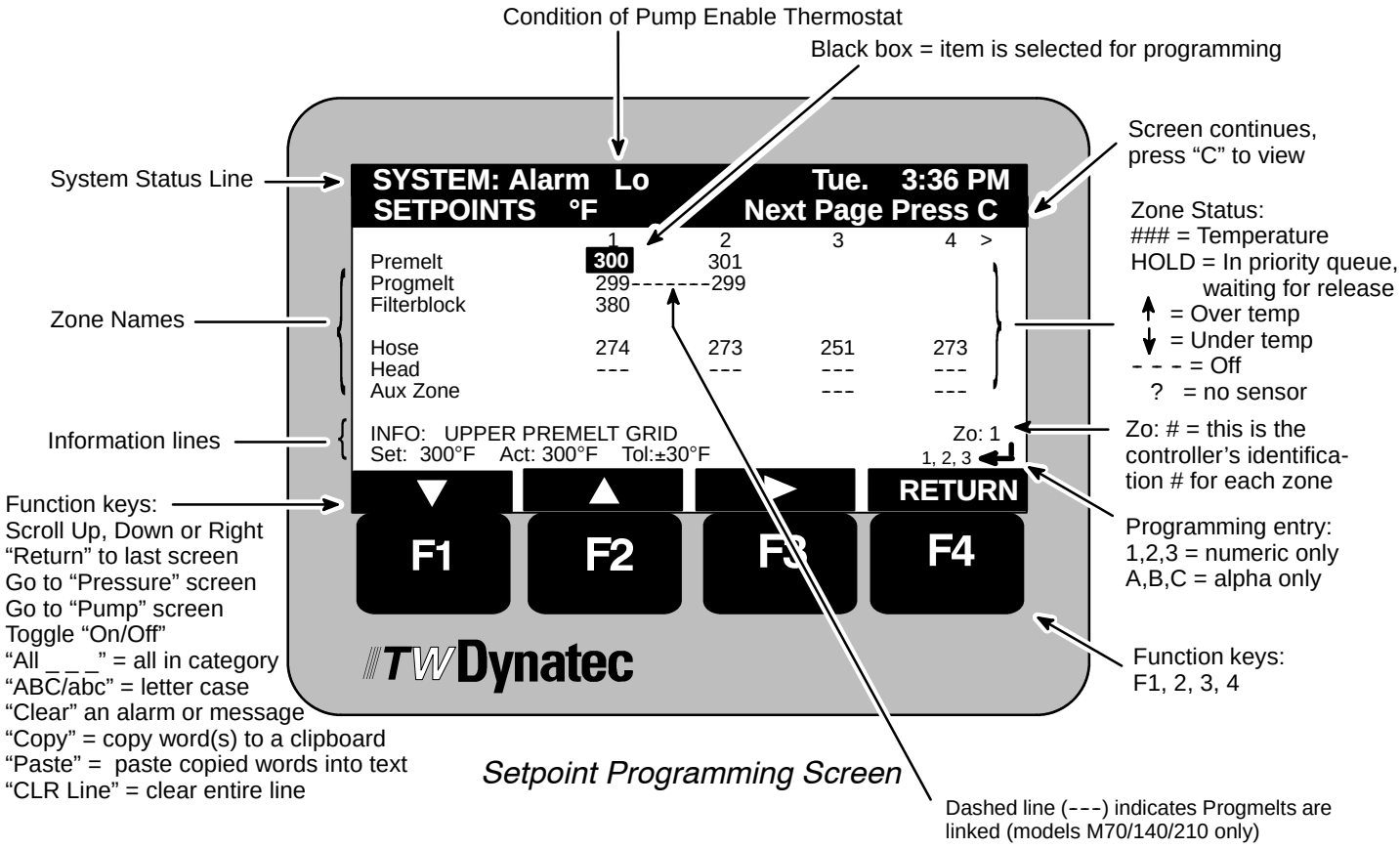
Numeric Keypad


current software version
SYSTEM: Alarm
Tue. 3:36 PM
P#
*** M-Control *** V5.00c
C
Program #:
P1, P2, P3 or P4
Flashing "C" indicates
optional serial commu-
nication (PC Link) is ON
Press Enter to activate or confirm
1, 2, 3 Enter a numeric value with 0 - 9 keys
A,B,C Enter a letter on the alpha-numeric
This item or this screen is locked
F This item is factory setup* only
< > Press button C to see more zones

HELP Screen (F4 on Actual Temperatures Screen)

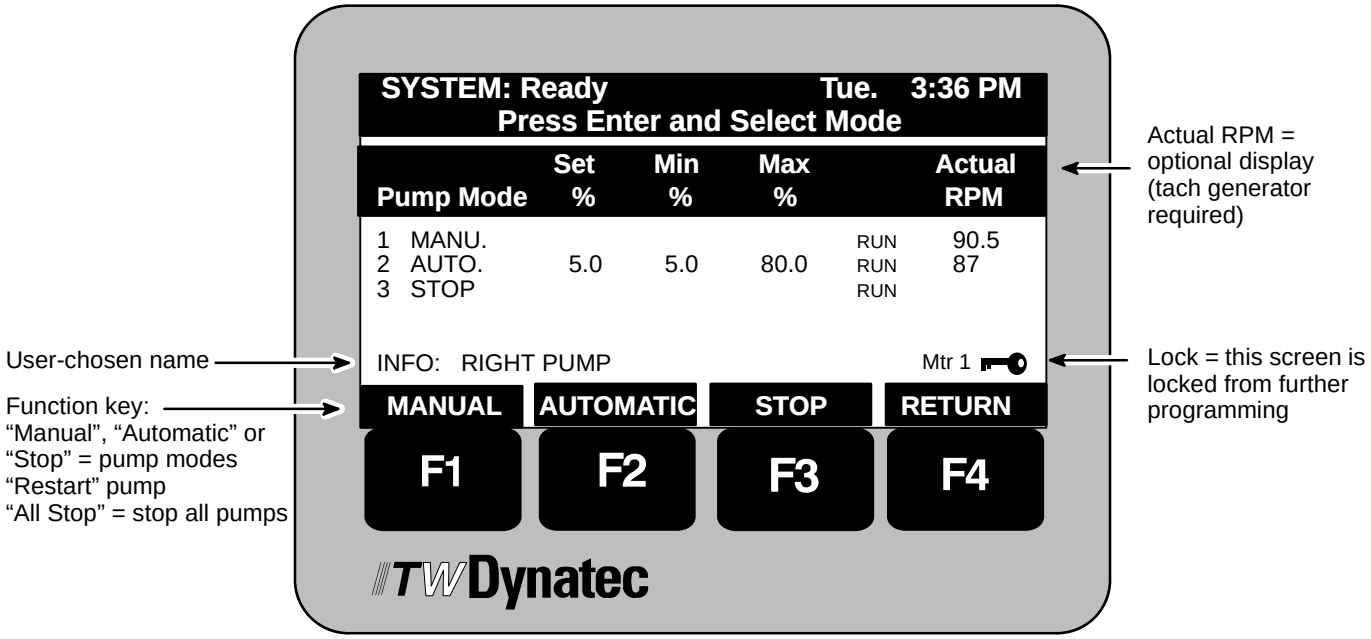
** Factory Setup = can be modified by ITW Dynatec's technicians only*

Display Reference, cont.



Setpoint Programming Screen

For illustrations of the screens of the Dual Hopper ASUs, see pages 5-28 & 29.



Pump Programming Screen

Basic Programming Sequence: Quick Reference

Follow the screen-by-screen steps outlined in the remainder of this chapter for complete setup and programming instructions. Thereafter, use this page as a "quick reference".

Press

Turn Controller On

x2, 6 Language Selection

x1, 8 Temperature Scale Selection

F4 Actual Temperatures:

- F1 To Program Setpoints
- F2 To Program Pump/ Motor(s)
- F2 To Program Optional Clutch(es)
- F3 To Program Optional Pressure Transducers

x1 Service Page 1:

1 = High Low Temperature Deviation
2 = Setback Temperature
3 = Setback/ Sleep Setup
4 = Setpoint Limitation
6 = Temperature Offset
7 = Sequential Heating
8 = Temperature Scale
9 = Change Security Lock or Access Code

x2 Service Page 2:

1 = Customer Zone Names
2 = Power On Configration
3 = Factory Defaults
4 = Keypad Locking
5 = PC Link
6 = Language
7 = LCD Contrast
8 = System Logbook
9 = Change Security Lock

To Program Scheduler

1 = Manual Standby Activation
2 = Time & Date Clock
3 = Program 7-Day Scheduler
4 = Select Program Recipes
5 = Manual Scheduler Activation

End

Controller Setup

Below is the step-by-step process of setting up the controller.

*Note: Whenever an Access Code is required, enter your individual code. The default code is 9999. If you have lost your code, call ITW Dynatec Customer Service: 1-800-538-9540 (in the USA) or contact your local repsentativ*e.

Turn the Controller ON

Turn the controller ON using the ASUs main On/ Off switch.

Language Selection

English is the default language. If you desire another language (choices are German, French, Italian, Spanish, Swedish, Portugese, Japanese and Dutch), make your selection:

Press the Service Key two times to advance to Service Page 2.

Press #6 on the numeric keypad, followed by Enter .

Press the numeric key of your language choice, followed by Enter .

(OR Scroll ▽ △ to your choice, then press Enter .

Note: To quickly return to the English language, turn the controller OFF. Then press both Enter and “9” and hold while turning the controller ON.

Temperature Scale Selection

Press the Service Key twice to advance to Service Page 1.

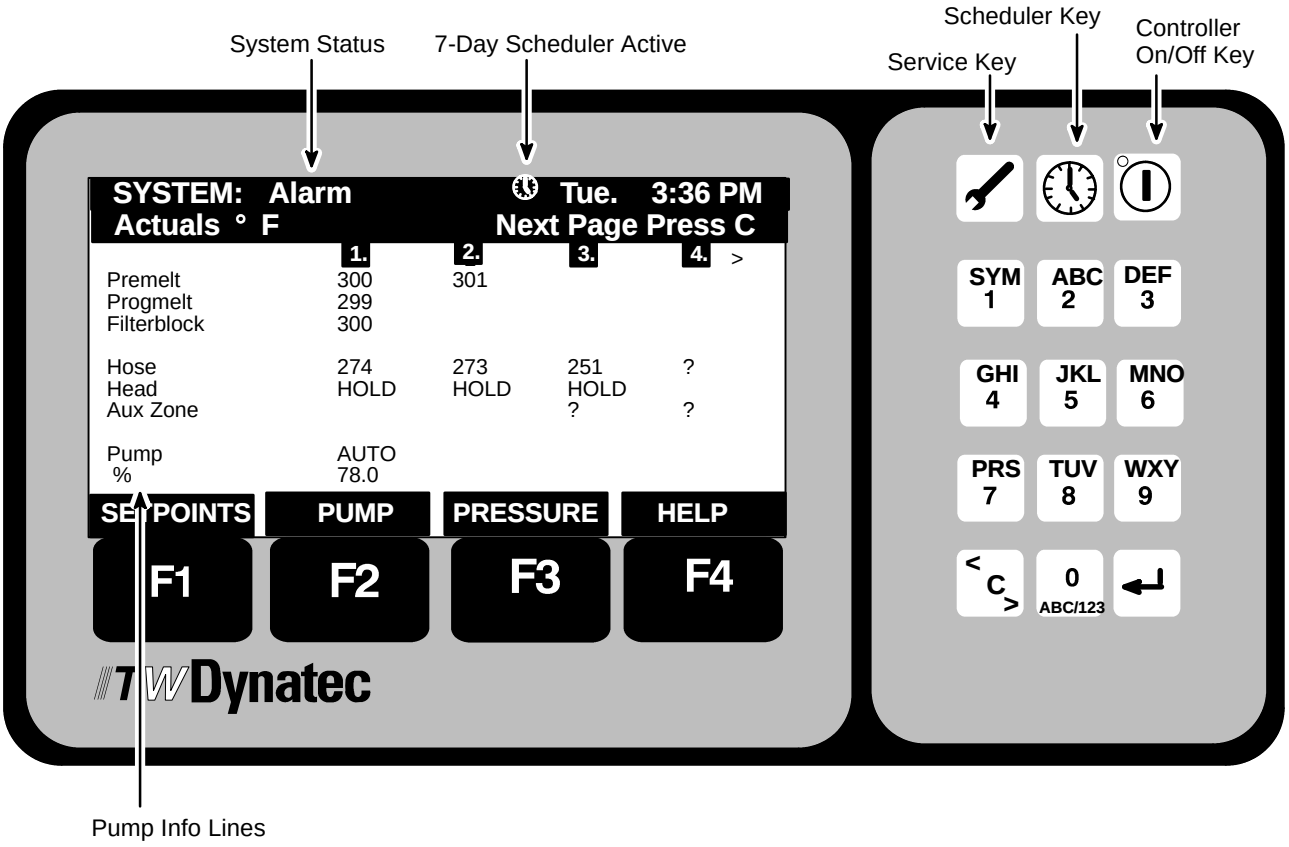
Press #8 on the numeric keypad, followed by Enter .

Toggle to make your choice between °C scale or °F scale. Press Enter.

Press Return (F4) to Go to the Actual Temperatures Screen

Actual Temperatures Screen

The Actual Temperatures Screen serves as the controller's main menu. From here you can go to any other screen. The Actual Temperatures Screen is also the most useful screen to display for monitoring purposes.



Use of the Actual Temperatures Screen

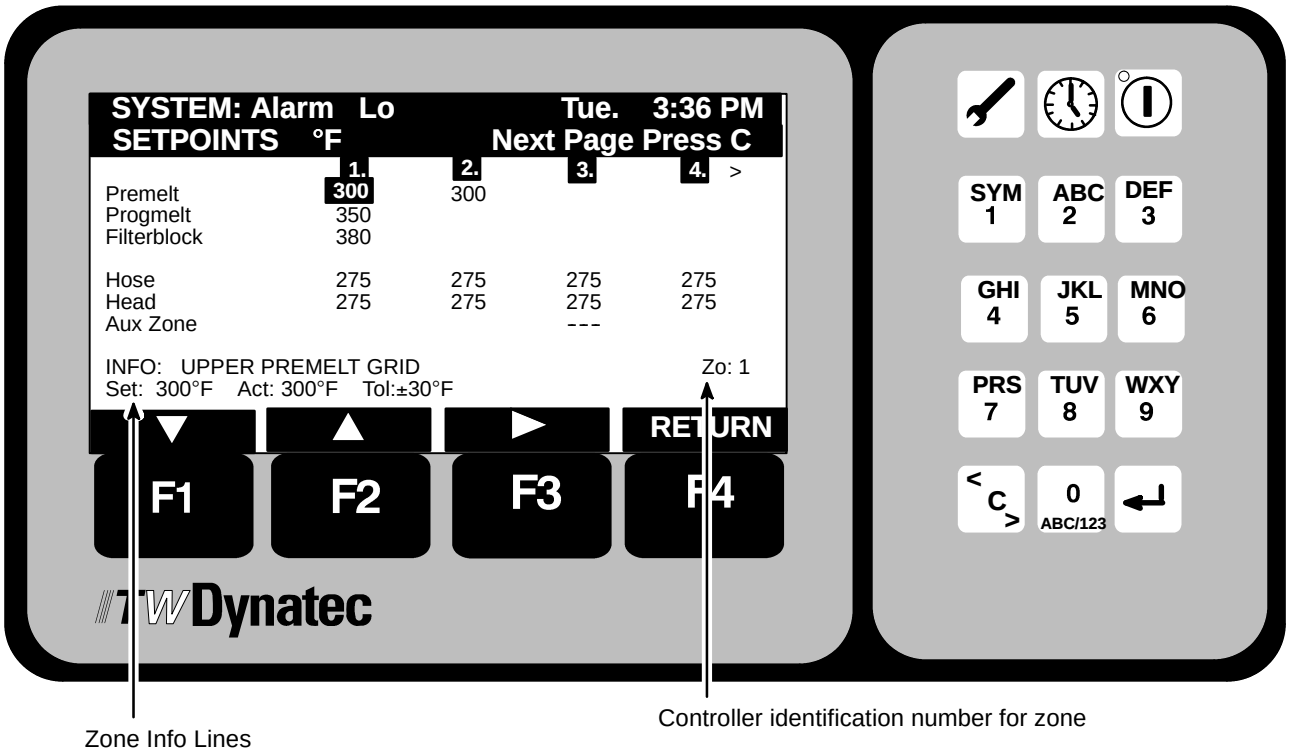
Press This Function Key	To:
On/Off	Toggle display, pumps and heaters power ON or OFF
Setpoints (F1)	Go to the setpoints programming screen
Pumps (F2)	Go to the pumps programming screen
Pressure (F3)	Go to the pressure screen
Help (F4)	Go to the Help screen.
Service	Go to the first of the three service screens
Scheduler	Go the the Main Scheduler screen

Use of the Actual Temperatures Screen, cont.

Programming Sequence (details on following pages)
1. Press Setpoints. After programming all of your temperature setpoints, return to the Actual Temperatures Screen.
2. Press Pumps. After programming all pumps and optional clutch(es), return to the Actual Temperatures Screen.
3. Press Pressure if optional pressure transducers are installed on ASU. After setting limits for all pressure transducers, return to the Actual Temperatures Screen.
4. Press Scheduler Key to program the following functions: Standby, Time & Date Clock, 7-Day Scheduler and/ or Program Recipes.
5. Press Help to view the Help screen (illustrated on page 5-2).

Monitoring:
1. System Status display describes system status as one of the following:
    a. System Heat up: power is ON but zone temperatures have not risen to setpoint range.
    b. System Ready: all zones have reached setpoint temperatures.
    c. Alarm: a temperature zone is out of its setpoint tolerance range. An overtemp alarm is indicated by an upwards arrow next to a temperature. An undertemp alarm is indicated by a downwards arrow next to a temperature.
    d. Alarm Lo: the pump enable thermostat (undertemp thermostat) is preventing operation due to a low temperature condition.
    e. Standby: the system is in a programmed standby state.
2. Actual Temperatures or Zone Status of all zones is displayed:
    a. ###: a three-digit number indicates a zone's actual temperature.
    b. HOLD: zone is waiting for release. Temperatures have not risen to setpoint range.
    c. Arrow up: zone is over temperature.
    d. Arrow down: zone is under temperature.
    e. ?: there is no sensor. Zone needs troubleshooting.
    f. >: there are more temperature zones not seen on the current display. To view them, press C on the numeric keypad (bottom row, first key).
3. 7-Day Scheduler Active display shows that the 7-Day Scheduler is programmed and in use.
4. Pump Info Lines indicate pump mode ("Auto" on the illustration on page 5-6) and external reference percent or set speed percent.
5. If the optional Actual RPM display (shown on page 5-3) is installed, actual pump rpm may be monitored.

Setpoints Programming Screen



Use of the Setpoints Programming Screen

Each of the temperature zones is programmed individually by using the function keys as follows:

Press This Function Key	**To:**
Scroll Up, Down or Right (F1, 2, 3)	Select each zone's setpoint
Return (F4)	Return to the Actual Temperatures Screen
↵ (Enter)	Enter a numeric value
All – – – (F1)	All zones in a category (ie, All Hoses, All Heads, etc.)
On/Off (F3)	Toggle a zone on or off
Clear (F4)	Eliminate an error message or alarm

Programming

1. Scroll to the first temperature zone setpoint you desire to program.
2. On the numeric keypad, enter the desired setpoint value.
3. Press Enter ↵ .
4. Scroll to the next setpoint to be programmed and repeat steps 2 and 3.

Notes:

a. To turn a zone OFF: scroll to zone, press Enter to select, press ON/OFF (F3).

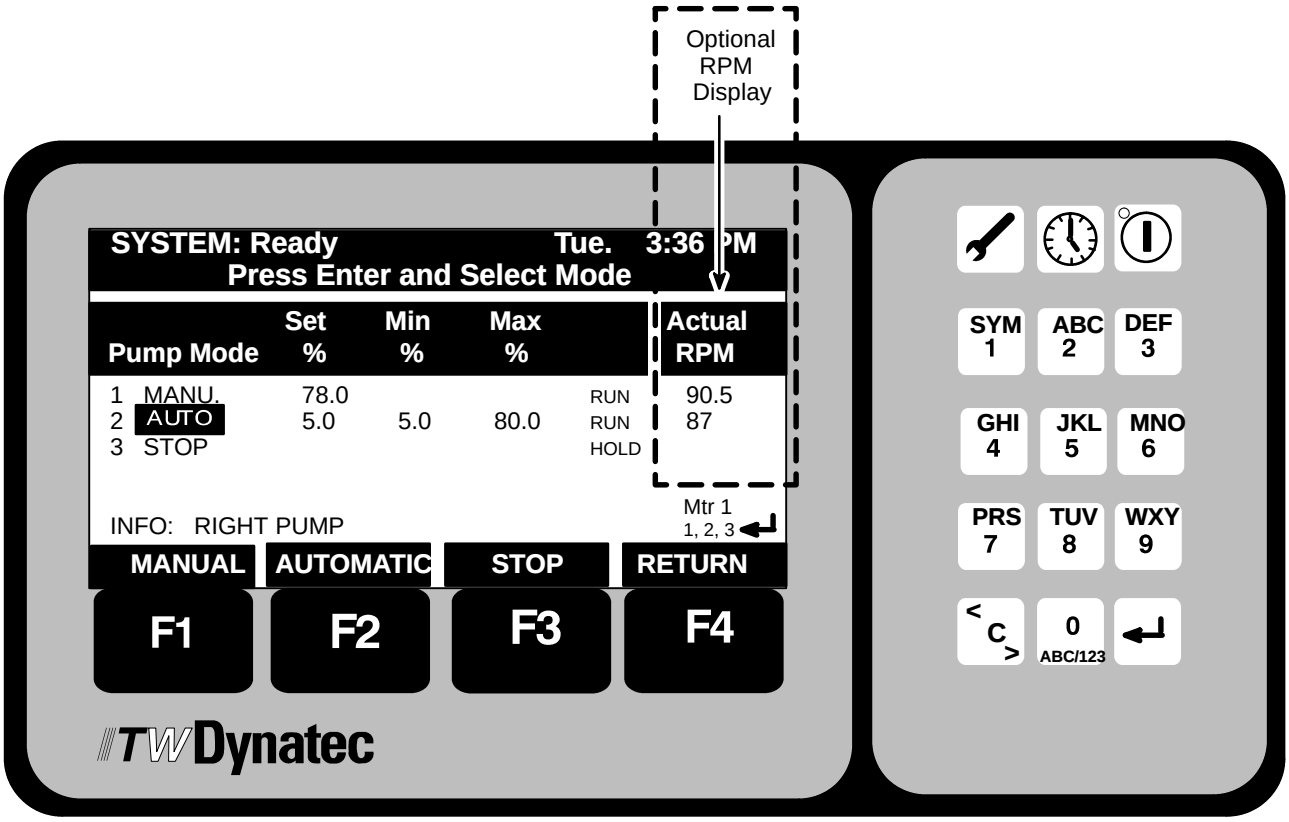
b. When turning a switched-off zone back ON, it will retain its previous setpoint.

c. To change all zones in a category (ie, all hoses, or all aux zones, etc.): scroll to one item in that category, enter desired value, then press F1 (this does not apply to zones which are turned OFF).

Monitoring

1. "Zo #": the number which appears here is the controller's identification number for this zone. This number cannot be changed by user.
2. The Zone Info Lines indicate the user-defined zone name (programmed on Service Page 2, menu item 1), the zone's setpoint, the zone's actual temperature, the zone's tolerance (programmed on Service Page 1, menu item 1) and the zone's identification number.

Pump Programming Screen



Alternative programming function keys:

Use of the Pump(s) Programming Screen

Each of the pump(s) is programmed individually by using the function keys as follows:

Press This Function Key	**To:**
Scroll Up or Down (F1, 2)	Select a pump.
Stop All (F3)	To stop all pumps in system
Re-Start (F4)	To re-start all pimps
Manual (F1)	Choose Manual Mode for the selected pump
Automatic (F2)	Choose Automatic Mode for the selected pump
Stop (F3)	Choose Stop Mode for the selected pump
Clutches (F2)	Go to the Clutch Programming Screen (if clutches are installed)
Return (F4)	Return to the Actual Temperatures Screen
↵ (Enter)	Enter a numeric value

Programming

1. Scroll to select a pump. Press Enter.
2. Press Manual, Automatic or Stop as desired pump mode. Press Enter.
3. If in Manual mode, enter pump speed ##.# in the Set % column:
   a. Use numeric keypad to enter desired rpm value.
   b. Press Enter.
4. If in Automatic:
   a. Scroll to Min % to program minimum pump speed. Enter value as described above.
   Note: typically, at 0 volts, this value will be between 0 and 10% (default = 0%).
   b. Scroll to Max % to program maximum pump speed. Enter value as described above.
   Note: typically, at 10 volts, this value will be between 0 and 100%, depending on motor installed on ASU (default = 100%).
5. Scroll to select next pump to be programmed. Repeat steps 2 thru 5 until all pumps are programmed.
6. If clutches are installed on ASU, Press Clutches (F2) to program (see next page).

Monitoring

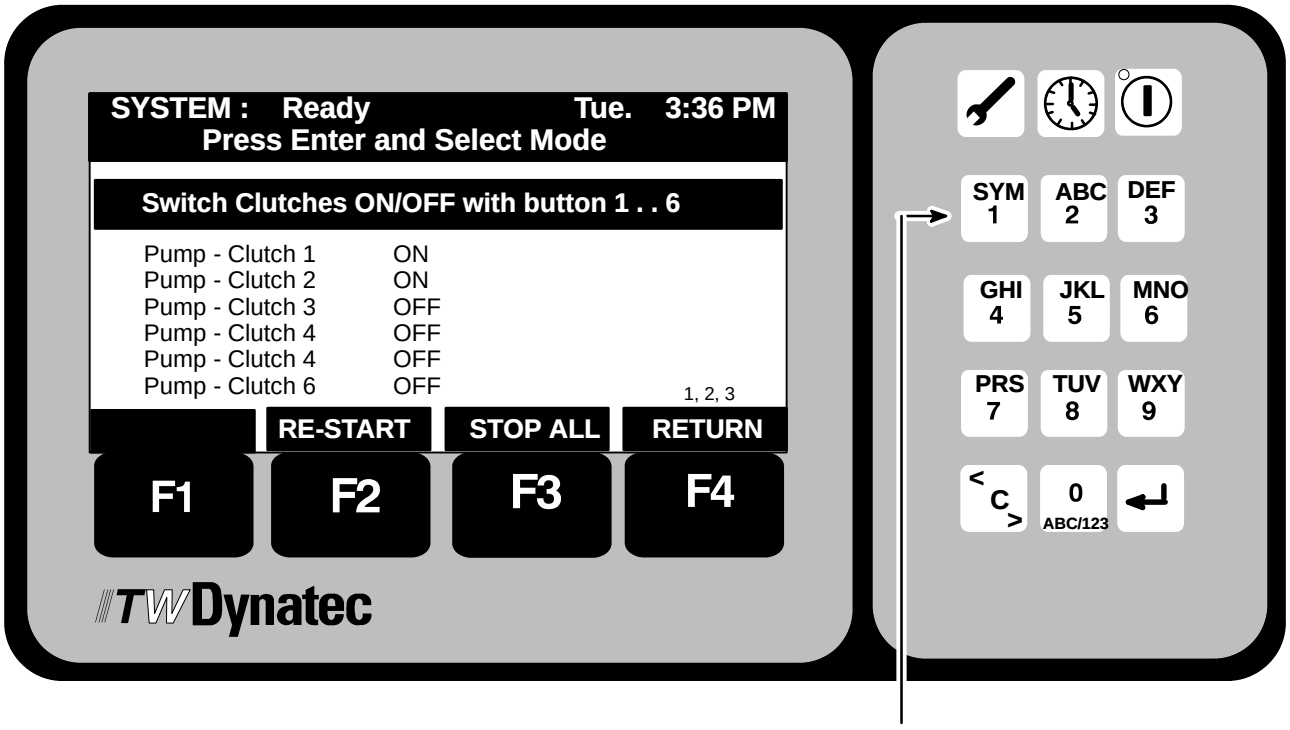
1. RUN indicates the pump/ motor is enabled.
2. HOLD indicates that the controller is preventing the pump/ motor from running, due to a low temperature, a standby condition, etc.
2. The Info Line indicates the user-defined name for the selected pump (programmed on Service Page 2, menu item 1).
3. If the optional Actual RPM display is installed, actual pump rpm may be monitored. With this option, the RUN/HOLD column is eliminated. The Actual RPM display is also seen on the Actual Temperatures Screen.

Optional Clutch Programming Screen

The Clutch screen is active, as a subset of the Pump Programming Screen, only if clutches are installed on your ASU. It is reached by Pressing F2 “Clutches” on the Pump Screen (seen on previous pages).

The number of clutches on the ASU will equal the number of motors:

For DM 35: there is a maximum of two pumps/ clutches
For DM 70/ 140: there is a maximum of four pumps/ clutches
For DM 210: there is a maximum of six pumps/ clutches



Turn Clutch ON/OFF using numeric keys 1 thru 6

Use of the Optional Clutch Programming Screen

Press This Function Key	To:
Re-start (F2)	Turn ON all clutches at once
Stop All	Turn OFF all clutches
Return (F4)	Return to the Pump Screen

Programming

1. To turn individual clutches On or Off, toggle individually on the numeric keypad.

Monitoring

1. On/ Off status of each clutch is indicated.

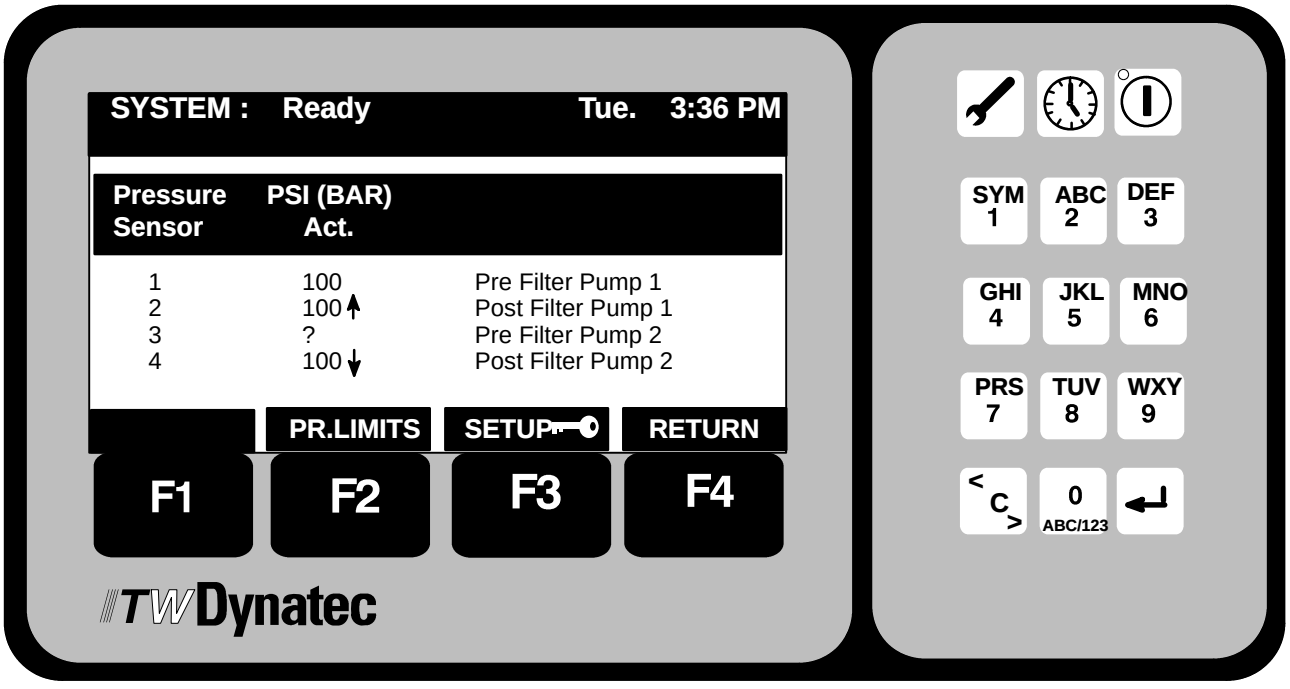
Optional Pressure (PSI/ BAR) Programming Screens

The two Pressure Programming screens are active only if pressure transducers (sensors) are installed on your ASU. They are reached by Pressing F3 “Pressure” on the Actual Temperatures Screen.

The number of pressure transducers on the ASU will vary per ASU:

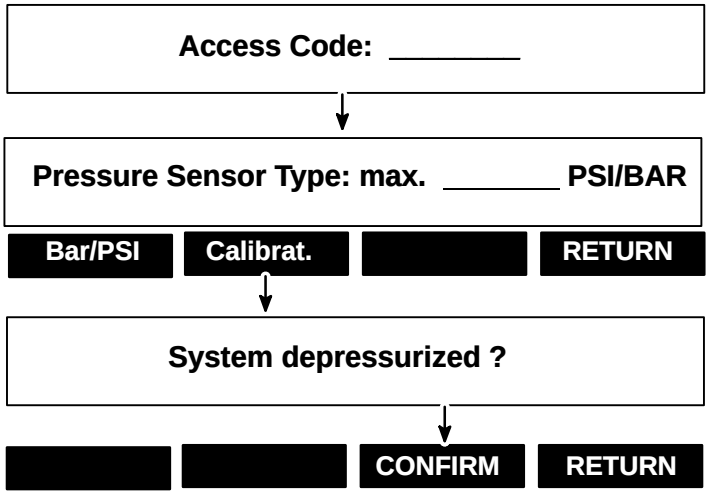
For DM 35: there is a maximum of four pressure transducers
For DM 70/ 140: there is a maximum of eight pressure transducers
For DM 210: there is a maximum of twelve pressure transducers

Pressure Screen #1 *cont.*

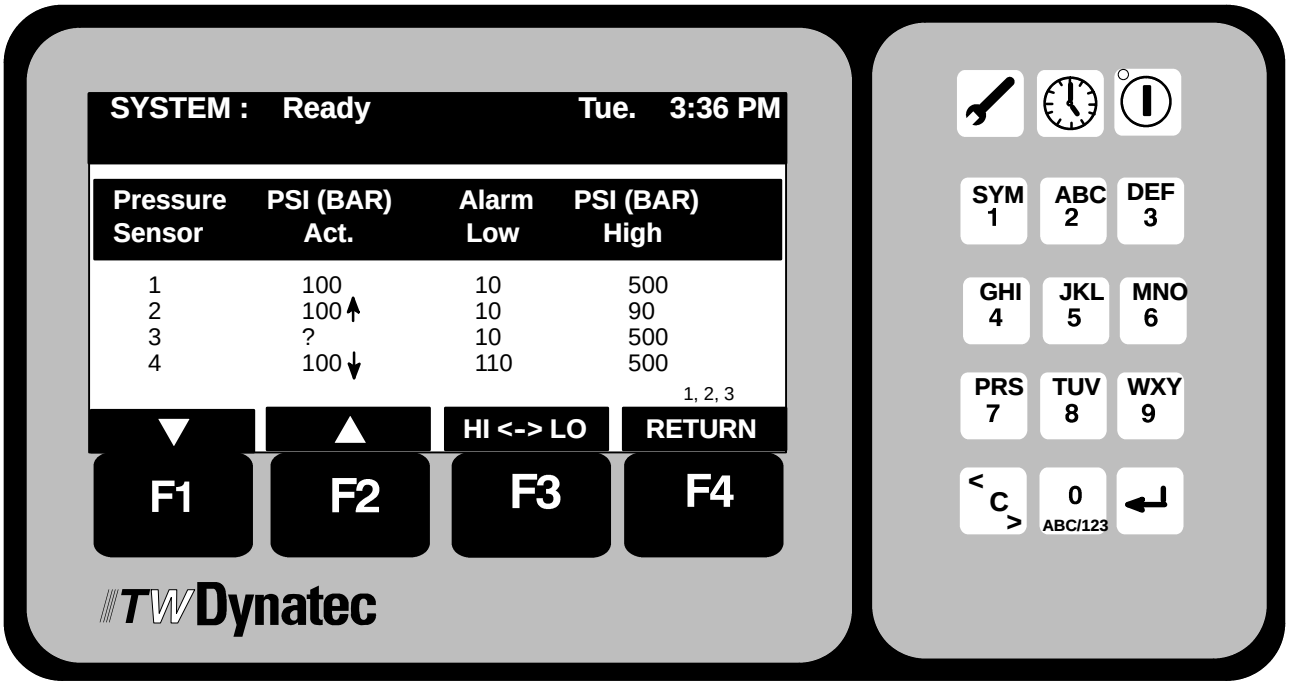


Optional Pressure (PSI/ BAR) Programming Screens, cont.

Pressing “Setup” (F3) on Screen 1 brings up a message screen:



Pressure Screen #2



Use of the Optional Pressure Programming Screens

Press This Function Key	To:
Pr. Limits (F2)	Go to Pressure Screen #2 to set low and high alarms
Setup (F3)	Enter access code in order to advance to calibration
Return (F4)	Return to the Actual Temperatures Screen
Scroll Up or Down (F1 or F2)	Select each sensor (transducer)
Hi <-> Lo ((F3)	Select the screen's high or low column
Bar/PSI (F1)	Choose pressure scale
Calibrat. (F2)	Calibrate all transducers

Programming

1. The names of the pressure transducers (shown on the preceeding page as "Pre Filter Pump 1", etc.) are programmed at Service Page 2, Function #1 (see page 5-19).
2. On Pressure Screen #1, press Pr. Limits (F2) to advance to Pressure Screen #2. Use the Scroll keys to select a Low or High limit for the first pressure transducer (sensor) to be programmed. Use the numeric keypad to enter your desired value. Press Enter. Repeat until all desired pressure transducers are programmed with Low and High pressure limits. Use Hi<->Lo (F3) to move between columns as necessary.
3. Press Return (F4) to return to Pressure Screen #1. Press Setup (F3). On the first message screen, enter your four-digit access code. On the second message screen, enter the maximum Bar/PSI value of the pressure transducer(s) installed on your ASU.
4. Press Bar/PSI (F1) to choose display in Bar or PSI.
5. Press Calibrat (F2) to calibrate all the pressure transducers installed. The controller will ask, "System depressurized ?", press Confirm (F3).

Note: Before confirming, verify that all transducers are at "0" pressure. Pumps must be turned OFF and time allowed for system pressure to drop to "0".

The controller will display "Waiting". After a few seconds, the Pressure Screen will appear and, in its last column, will list if each pressure transducer has "Passed" or "Failed" the calibration. (Note: "Failed" indicates a problem with the transducer or the Pressure PCB.)
6. Press Return (F4) to return to Pressure Screen.
7. Press Return (F4) again to return to Actual Temperatures Screen.

Monitoring

1. Actual pressure values may be monitored for each transducer on either screen.
2. Over pressure ↑ or Under pressure ↓ arrows indicate conditions.
3. A question mark ? indicates that no transducer is installed, or that installation is not complete for this transducer position.

Service Functions Screens

The three Service Function Screens are designated Service Page 1, Service Page 2 and Service Page 3. They are accessed by pressing the Service Key 1, 2 or 3 times.

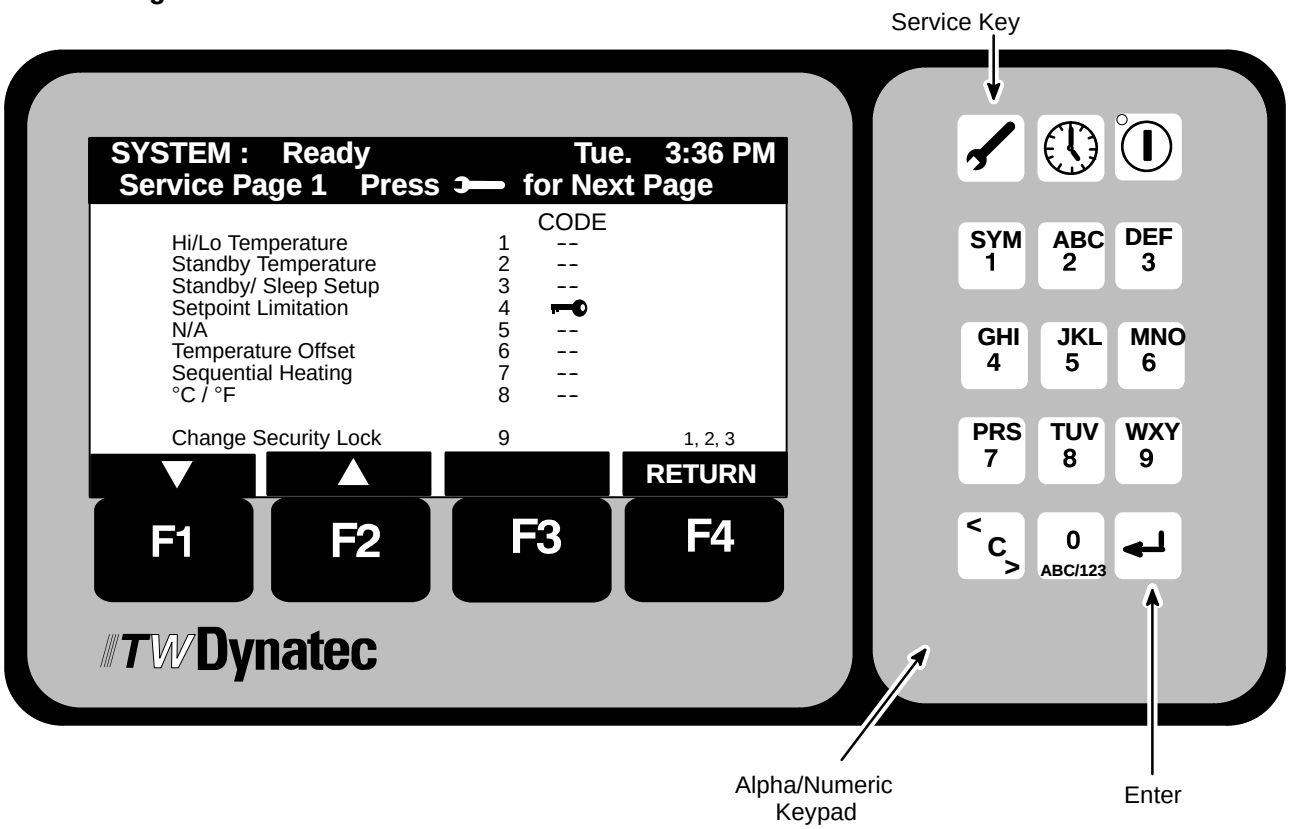
Functions coded -- are active and require no code to program.

Functions coded with a key are locked and require entry of a code before programming. *For example, as seen on the diagrammed screen below, Setpoint Limitation is locked from further programming.*

Functions coded F are ITW Dynatec factory setups and are not user accessible.

Program the Service Functions as described on the following pages. Many functions are programmed simply by a toggle or by a single numeric entry.

Service Page 1



Service Functions Screens, Page 1 cont.

Function #

Press #1 to program High/ Low Temperature Deviation. Enter a numeric value for the first zone selected. Press Enter to confirm. Scroll to next desired zone and repeat until all zones are programmed. Then Press Return (F4) to return to menu. Note: after entering one value in any category, you may press All xxx. (F1) to change all the items in that category.

The High/ Low Temperature Deviation is a range (±) representing the high and low temperature limits of each setpoint. During operation, these limits activate the error alarms which alert the operator to over-temp and under-temp conditions in the temperature zones. The smallest deviation programmable is ±5° (C or F) and the largest is ± 50°.

Press #2 to program Standby Temperature. Enter a numeric value for each category. Press Enter. Press Return (F4). Note: if the same Standby Temperature is desired for all zones: enter the value in the first row, then press Enter.

The Standby Temperature is a reduction in temperature by which all the temperature zones will be reduced in a standby condition. For example, if the hopper setpoint is 275° and you program a 100 degree standby temperature, the controller will reduce the hopper temperature to 175°. Numerically, the controller will accept any standby temperature within the range of -30°C and -150°C (-30°F and -150°F).

Press #3 to program Standby Time Delay and Sleep Mode. Enter a numeric value for the time delay. Press Enter. Toggle (press F1 or F2) to Sleep Mode. Enter a numeric value for Sleep Mode Delay. Press Enter. Press Return (F4).

The Standby Time Delay allows programming of a delay from the time the "external standby" terminals (for connection, see Chapter 3) are connected until the ASU enters its standby mode. The time delay selected must be in the range from 0:00 (which represents an immediate entry into standby, i.e. no delay) to 18.0 hours.

The Sleep Mode may be activated only during Standby. It becomes activated after a programmed length of time (0.1 to 18.0 hours). During Sleep Mode all heaters are turned OFF and the motors are stopped. The display reads "F1 to Start Heating" when in Sleep Mode. To disable the Sleep Mode, press Disable (F3).

Standby and Sleep Mode work together. For example, if you program a Standby of 1 hour and a Sleep Mode of 3 hours, the ASU enters Standby one hour after the external contact is closed. The ASU enters Sleep Mode three hours after entering Standby.

Press #4 to program Setpoint Limitation. Enter a numeric value. Press Enter. Press Return (F4).

The Setpoint Limitation is a universal maximum temperature for all temperature zones (ie, the overtemperature limit). The controller will not allow the operator to program a higher setpoint than the value of the setpoint limitation. The default setpoint limitation is 218°C (425°F). The selectable range for the setpoint limitation is 40°C - 232°C (100°F - 450°F).

Function #5 is not active in the present controller configuration. No programming is possible.

Service Functions Screens, Page 1 cont.

Press #6 to program Temperature Offset. Enter a numeric value for the first zone selected. Press Enter. Scroll to next desired zone and repeat until all zones are programmed. Press Return (F4). Note: to enter a negative value, enter the value, then press Negative (F3).

The Temperature Zone Offset is a mathematical factor which compensates for differences in temperature between the placement of the system's heaters and sensors. An offset is often used for large applicator heads, printrolls, printwheels or other custom devices. Usually no offset is required for standard heads. The offset may be programmed up to ± 50 degrees (C or F) of the zone's temperature.

Press #7 to program Sequential Heating. Scroll to choose one of the three selections: No sequence, First all hopper zones or Hold electric head. Press Confirm (F3).

Sequential heating allows you to choose the heating order of the temperature zones, so that zones requiring more time to heat up to temperature can be programmed to begin heating before others. In the case of the "Hold Electric Head" selection, programming of a reduced temperature for ten minutes allows for the stabilization of the electric valves.

a. A "No sequence" designation means that all temperature zones will begin to heat immediately after the ASU is powered on.

b. "First all hopper zones" means that the hose/ head/ auxiliary zones do not begin heating until all hopper zones have reached the low limit of their setpoints. Zones which are switched OFF are not applicable.

c. "Hold Electric Heads at xxx F for 10 minutes" applies to systems utilizing electric applicators only. After choosing this selection and programming the temperature (to the softening point of your adhesive, see your adhesive manufacturer), the controller holds all electric heads at the operator-selected temperature for ten minutes before releasing them to operating setpoint.

The controller's default heating sequence for the Dynamelt ASU is first all hopper zones. This allows the larger mass of adhesive in the hopper to begin heating immediately.

Press #8 to program Temperature Scale. Program directly on the menu screen by pressing #8 key to choose between Centigrade or Fahrenheit. Press Return (F4).

Press #9 to Change Security Lock for Service Page 1. Enter your access code. Press Enter. Scroll F1 or F2 to select desired function. Press F3 to Lock or Unlock function from programming. Repeat for each desired function.

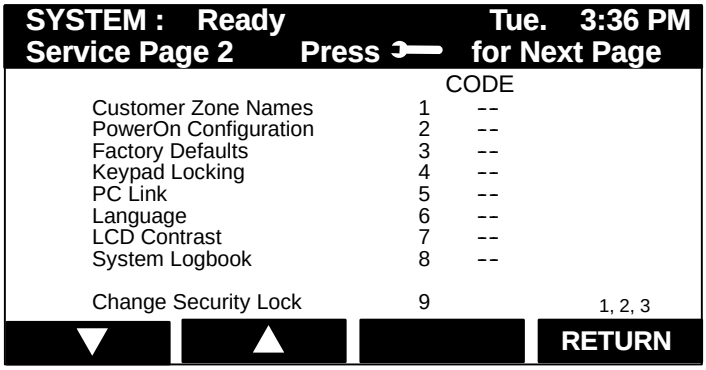
To Change Your Access Code: Scroll F1 or F2 to select "Change Access Code". Enter your desired new access code. Press Enter to Confirm. Press Return (F4).

Press Service Key to advance to Service Page 2.

Service Functions Screens, cont.

Service Page 2

Programming of the Service Functions on this screen is similar to the programming of Page 1.



Function #

Press #1 to program Customer Zone Names. *This function allows the programmer to enter his desired name for each temperature zone, pump and (optional) pressure transducer. This up-to-20-character name will be the name displayed in the controller's Info Lines. Program following these rules:*

a. use the Alpha/Numeric keypad to enter letters and numbers. When entering letters, use one, two or three presses of a key to distinguish between the letters. Press Enter after each desired letter or number is in place.
b. press the 0 (zero) key to toggle from letters to numbers,
c. press the SYM key to enter a space, colon, dash, dot, "Q", "Z" or other special characters,
d. press F1 to toggle from upper to lower case,
e. you cannot back up. If an error is made, press Enter repeatidly to advance through the name loop until you reach the point for correction and re-write as desired,
f. press CLR LINE to clear an entire line,
g. you may COPY (F2), PASTE (F3) and then modify to save time when names are similar,
h. press F4 to advance to the next motor or zone to be named.

To program Customer Zone Names: Press F1 to program Temperature zones, F2 to program Pumps or F3 to program Pressure Transducers. Scroll to the first item to be named. Press Enter to allow naming. Using the Alpha/Numeric keypad and following the rules given above, spell out name as desired. Press F1, F2 or F3 to select another item to name. Repeat until all items are named as desired. Press F4 again to Return to Service Page 2 screen.

Press #2 to program Power On Configuration. *This function gives the user the choice of having the heaters and pumps come on (or remain off) whenever the ASU is powered on.* USA default is both On. European default is Heaters On, Pumps Off. Note: programming here overrides programming made at the next Service Function (Function #3 Factory Defaults).

Press 1 to toggle the heaters On or Off. Press 2 to toggle the pumps On or Off. Press 3 to toggle the external inputs On or Off. Note: if you select heaters Off, the controller will remind you, at power on, to press F1 to turn the heaters On.

Service Functions Screens, Page 2 cont.

Press #3 to program Factory Defaults.

CAUTION: Factory Default programming is not essential. If done improperly, it can cause re-programming of setpoints to be necessary. If you are satisfied with your ASU's setup, you may leave Factory Defaults unprogrammed.

Upon entering this screen, the "ASU Type" (model) of your melter will be displayed. Use this screen to program the quantity of hoses, quantity of premelt grids and quantity of pumps installed on your ASU, if desired. It is o.k. to leave these items unchanged or with "?" selected.

Scroll (F1) to the line you wish to amend (ie, hose, premelt, pump). Press Change (F2) repeatedly to view the list of possibilities for this line. Press Change until your desired quantity is displayed. Repeat until all lines are programmed.

Then, Scroll (F1) to Configure EU/ US. Press Change (F2) to toggle between EU Setup or US Setup for setpoints and parameters* if required.

Press Load (F3). Then press Confirm (F1). Press Return (F4) to return to menu.

**Choosing EU or US reloads all factory setpoints and parameters as follows:*
EU (European) Setup = Temperature scale is Centigrade, pressure is measured in BAR, pumps are in STOP mode at startup and heaters are active at startup.

US (United States) Setup = Temperature scale is Fahrenheit, pressure is measured in PSI, pumps start in the mode they were left in at shutdown and heaters are active at startup.

Press #4 to program Keypad Locking. Scroll to either Temperature Settings or Pump Settings. Press F3 to toggle Locked or Free. Scroll to other setting and press F3 to toggle Locked or Free. Press F4 to Return to menu.

Selecting Locked prevents further programming to either temperature setpoints or pumps. Selecting Free allows further programming.

Press #5 to program optional PC Link (serial communication). Scroll to select either:
"Load: from Computer to this Controller" or
"Save: From this Controller to Computer.
Press F1 to Load. Press F2 to Save. Press F3 to Configure BAUD rate or FIFO. The message "Waiting" indicates the controller/ computer is processing data. The message "Transmission Done" indicates the computer/ controller has completed transmission. Press F4 to Return to menu.

The DynaControl is capable of bi-directional data transfer of all system parameters to a remote computer. If this option is installed on your ASU, program it at this step. To program your remote computer, see page 5-27. When PC Link is installed and the external serial communication is ON, a flashing "C" appears at the upper right of the HELP screen.

Press #6 to program Language. Scroll to desired language. Press F4 to Return to menu.

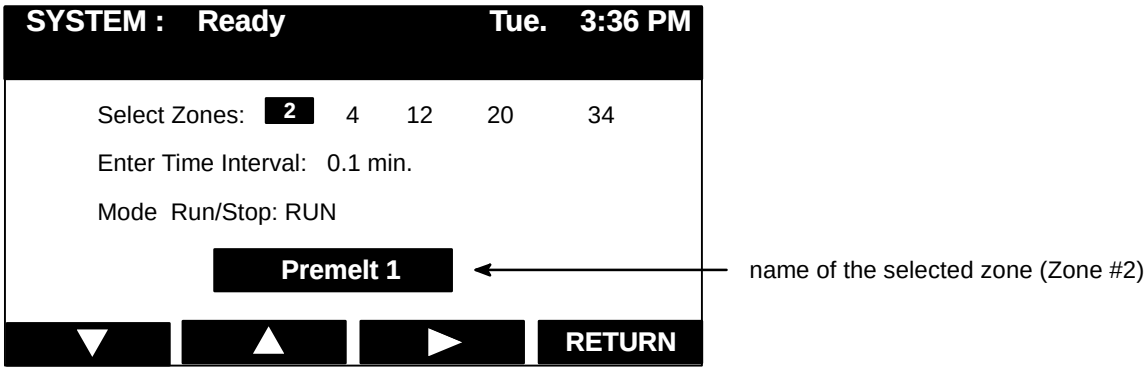
Press #7 to program LCD-Contrast. Press F1 (+) to increase contrast or F2 (–) to decrease contrast of display. Press F4 to Return to menu.

Service Functions Screens, Page 2 cont.

Press #8 to program System Logbook. The System Logbook has the following functions:

1. System Logbook: a list of the last 1,000 controller events. Use F1 and F2 to move forward or backward thru the logbook. Use F3 Configuration to choose to log “all system data” or “errors only”.

2. Data Logger: a list of the last 1,000 lines of actual temperatures for up to five selected zones. The time interval at which these temperatures are recorded is programmable. The first screen of the Data Logger is the actual data list. Move through the data by pushing F1 Forward or F2 Backward. To program, press F3 Configure. The Data Logger programming screen is seen below. Use the arrows to select a desired function. Use the numeric keypad to enter zone numbers or the time interval (in 1/10ths of a minute). Press Enter to confirm your choices. Toggle to select Mode.

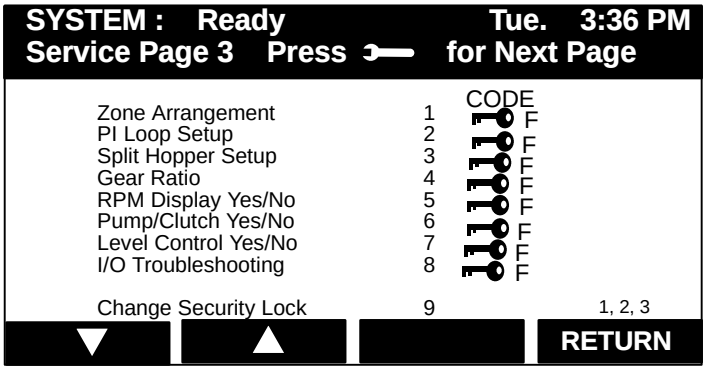


3. Elapsed Hours: the number of hours that the system has been running. Not resettable.

Press #9 to Change Security Lock for Service Page 2. Enter your 4-digit access code. Press Enter. Press F1 or F2 to select desired function. Press F3 to Lock or Unlock function from programming. Repeat for each desired function. Press Return (F4). Press Return (F4) again to go to Actual Temp Screen.

Service Page 3

All of the functions on Service Page 3 are ITW Dynatec-accessible only. No operator programming is possible.

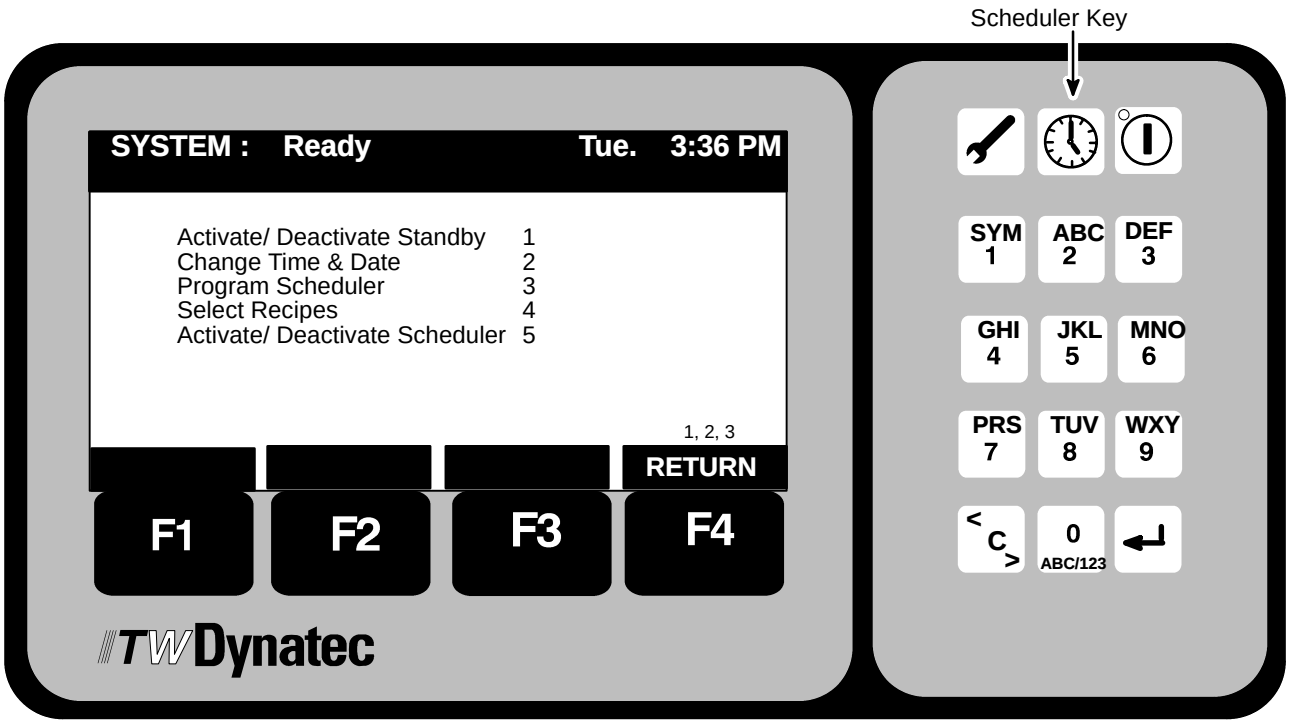

SYSTEM : Ready
Tue. 3:36 PM
Service Page 3 Press for Next Page
CODE
Zone Arrangement 1 F
PI Loop Setup 2 F
Split Hopper Setup 3 F
Gear Ratio 4 F
RPM Display Yes/No 5 F
Pump/Clutch Yes/No 6 F
Level Control Yes/No 7 F
I/O Troubleshooting 8 F
Change Security Lock 9 1, 2, 3
RETURN

Programming at Main Scheduler Screen

The Main Scheduler Screen functions include Standby, Date & Time Clock, 7-Day Scheduler and Program Recipes.

Press the Scheduler Key to advance to the Main Scheduler Screen.

Main Scheduler Screen



Use of the Main Scheduler Screen

Function #

Press #1 to manually activate or deactivate Standby. Press Press F4 to return to the Main Scheduler screen. Note: use of this key will override a programmed Standby.

Press #2 to program the time-of-day and date-of-year clock. Press F1 or F2 to change a selected item, press F3 to select another item. Press Press F4 to return to the Main Scheduler screen.

Press #3 to program the 7-Day Scheduler. See programming details and screen on following page.

Press #4 to select an active recipe (1-4). Use F1 or F2 to select recipe #1, 2, 3 or 4. Press F3 to Confirm. Press F4 to return to the Main Scheduler screen.

Up to four separate setpoint recipes (programs) can be programmed and stored in the controller, though only one recipe is active at any given time. Setpoints may differ from one recipe to another. When switching between recipes, the new recipe's setpoints take over, so there may be error alarms if the new recipe's unused temperature zones are turned on.

The program recipes are referred to as: Recipe 1, Recipe 2, Recipe 3 and Recipe 4.

To create a Recipe: advance to the Main Scheduler Screen and press #4. Use F1 or F2 to choose a recipe number (for this example, say #2). Press F3 to confirm. Press F4, then press F4 again to go to the Actual Temperatures Screen. Program all controller setpoints and functions as outlined on page 5-4. When all programming is completed, Recipe #2 is created.

Press #5 to activate or deactivate the 7-Day Scheduler. Press F4 to return to the Main Scheduler screen.

Press F4 to return to the Actual Temperatures Screen.

Shortcuts

1. To activate or de-activate the Scheduler from the the Actual Temperatures Screen (Main Menu): toggle by pressing and holding the Service (wrench) Key for five seconds.

2. To activate or de-activate Standby from the the Actual Temperatures Screen (Main Menu): toggle by pressing and holding the Scheduler (clock) Key for five seconds.

Programming of 7-Day Scheduler

7-Day Scheduler

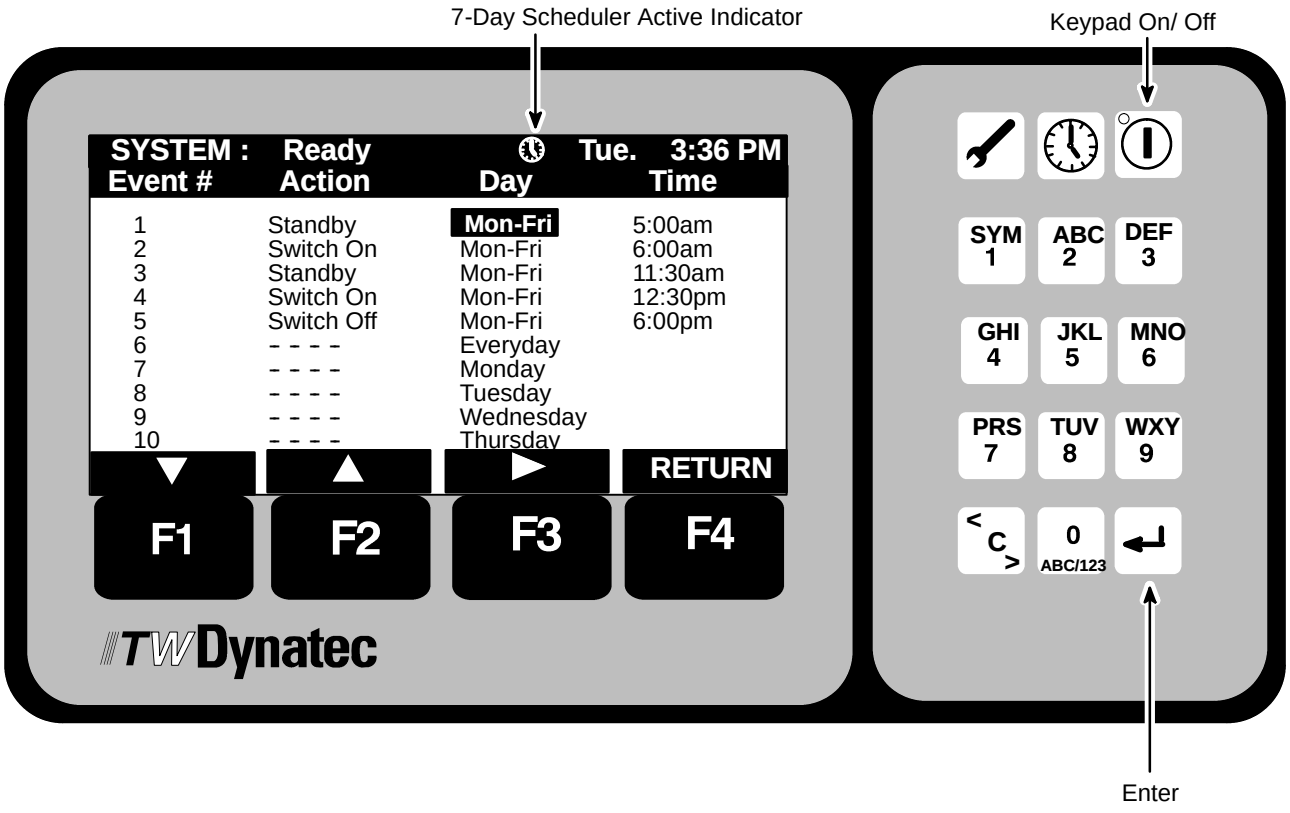
The Seven-Day Scheduler allows the operator to program main power ON and OFF times which coincide with his daily production schedule throughout the work week. Up to ten “events” may be scheduled. An event is a specific day and time or every day at the same time.

An ASU which has an active seven-day scheduler should be turned ON at the main power switch. It should not be turned off by the main power switch while the scheduler is active. To turn the ASU OFF (temporarily overriding the scheduler), use the DynaControl On/ Off keypad icon.

In the event of a power outage, or a manually switched main power ON, an active scheduler overrides the “Power On Heater Start” parameter. That is, if the scheduler is in “Switch ON” at the time of a power ON, the heaters will be turned ON. Likewise, if the scheduler is in “Switch OFF” at the time of a power ON, the heaters will be turned OFF.

When the seven-day scheduler is programmed and active, the scheduler icon on the controller screen flashes continuously.

7-Day Scheduler Screen



Use of the 7-Day Scheduler Programming Screen

Press This Function Key	To:
Scroll Up, Down or Right (F1, 2, 3)	Select an individual action, day or time
Return (F4)	Return to the Main Scheduler Screen
↵ (Enter)	Enter a chosen selection

Programming

1. Press F3 to scroll to the Action column. Then scroll to the first event you desire to program.
2. Press Enter ↵ until the desired Action [ie, Standby, Switch On, Switch Off or – – – (no event)] is displayed.
3. Scroll (F3) to the Day column.
4. Press Enter until the desired Day (ie, Mon–Fri, Everyday or any individual day) is displayed.
5. Scroll (F3) to the Time column.
6. Press Enter to display the time you desire the event to start. Enter hour, minutes and am/ pm individually.
7. Repeat steps 1 through 6 for each event desired.
8. Press F4 to return to Main Scheduler screen.

Up/Downloading Instructions: Controller to Remote PC (PC Link)

The Upload/ Download functions are used to transfer system information and data from or to the DynaControl. To do this, the DynaControl must be connected to an external PC or PLC via a serial cable. The data format is an ASCII text with TAB-delimited data. This text can be created with standard word-processing programs or spreadsheet applications and up or downloaded via terminal programs. Both functions are 'on–demand'-functions, i.e. they must be started on the DynaControl keypad.

Hardware Hookup

Remove the controller mounting bracket from the ASU via four screws accessed from inside the panel box assembly. Using a standard serial extension cable (Male/Female DB9) (if necessary, utilize a DB25 to DB9 adapter), connect either of the DynaControl controller's serial ports (on the Display CPU PCB, see illustration on page 7-5) to the remote computer's COM1 or COM2.

Download Instructions

Download = Transfer data from an external PC to DynaControl

1. DynaControl must be connected to a PC via a Null–Modem–Cable.
2. Start the terminal program on PC.
3. Start PC Link on DynaControl (Function #5 on Service Page 2).
4. If necessary, select Configuration (F3) and change baudrate, than re-enter Function #5.
5. Address setting is not used.
6. Press LOAD (F1).
7. Send ASCII file on terminal program.
8. DynaControl screen should list all received lines.
9. Press RETURN to exit service mode.
10. Customer zone text (command *Text) requires the zone number (temperatures: 1-48, pumps 49-54, pressure 55-66).

Download File Format

The downloaded ASCII text is line-oriented. Pages 29 and 30 show all possible line commands. Each line starts with '*' and the command, following a number of parameters, depending on the command. Each parameter must be separated with a horizontal tab (char # 09h). A tab-character must be placed after the last parameter in each line.

Examples:
1. Downloading data for the first filterblock zone

**Filterblock [tab] 1 [tab] 325 [tab] 30 [tab] 0 [tab] ON [tab]*

This will set the first filterblock to a setpoint of 325 degrees, tolerance = 30, no offset, zone is switched ON.

2. *Text [tab] 50 [tab] Pump 1, Factory Side

This will program the customer pump name for motor #2 (which could be pump #1!) with the string: "Pump 1, Factory Side"

cont.

*Important Note: the last command in the download file must be *End#*

Notes:

The command lines may be arranged in random order.
Maximum file length is 5000bytes.
Each data field may have a comment text ([tab] Setpoint:325F [tab] = [tab] 325 [tab]).
The DynaControl list screen indicates the commands in abbreviated form.
A '?' after the command on the DynaControl list screen indicates a wrong parameter.
'ER" indicates unknown command or syntax error.
If downloading system info using the *System command, the controller does not check for validity of the parameters.

Upload Instructions

The upload function will send an ASCII file to the external PC/PLC. The file contains all zone-related information. The size of the file depends on the number of zones, pumps and pressure transducers.

The data format is similar to the download file.

Example:

```
…..
*PREME.   1    410   35     -5     ON
…..
*PUMP      2    M     850    100   900
```

Premelt #1: setpoint 410, tolerance 35, offset –5, zone is ON
Pump #2: manual mode with 85.0%, min. speed for automatic 10.0%, max. speed 90.0%

Customer zone names will be indicated with: *TXT-TE for temperature zones
*TXT-PU for Pumps
*TXT-PR for Pressure transducers

1. DynaControl must be connected to a PC via a Null-Modem-Cable.
2. Start terminal program on PC.
3. Start PC Link on DynaControl (Function #5 on Service Page 2).
4. If necessary, select Configuration (F3) and change baudrate, then re-enter Function #5.
5. Address setting is not used.
6. Start "Capture Textfile" at terminal program.
7. Press SAVE (F2).
8. Stop and close file on terminal program.
9. Press RETURN to exit service mode.

Line Commands ***(page 1 of 2)***

*Premelt	No#	Setpoint	Tolerance	Offset	On/Off
*Progmelt	No#	Setpoint	Tolerance	Offset	On/Off
*Filterblock	No#	Setpoint	Tolerance	Offset	On/Off
*Hose	No#	Setpoint	Tolerance	Offset	On/Off
*Head	No#	Setpoint	Tolerance	Offset	On/Off
*Aux Zone	No#	Setpoint	Tolerance	Offset	On/Off
	1–12	50–450	5–50	0–50	ON / OFF

*Pressure	No#	Min–Pressure	Max–Pressure
	1–12	0–1500	0–1500

*Pump	No#	Mode	Manual%	Automatic–Min%	Automatic–Max%
	1–6	Manu/Auto/Stop	0–100.0%	0–100.0%	

0–100.0%

*Text	No#	Customer Name
	Temp.:1–48 Pumps: 49–54 Press.: 55–66	20 characters

Line Commands ***(page 2 of 2)***

*System	1	Setback Premelt	Setback Progmelt	Setback Filterblock	Setback Hose	Setback Head	Setback Aux.Zone
*System	2	Setback General	Setpoint Limitation	Heat up Sequence (0,1,2)	Electr.Head Hold Temp.	°C / °F (°C=0, °F=1)	Spare
*System	3	Power-On Heater 0/1 (1 = Start)	Power-On Motor 0/1 (1 = Start)	Keypad Lock Temp.Settings 0= free, 1= locked	Keypad Lock Motor Settings 0= free, 1= locked	Configuration Lock Page 1 Bit0…Bit7, 1= lock	Configuration Lock Page 2 Bit0...Bit7, 1 =lock
*System	4	PI-Loop Premelt (High= I Low= P)	PI-Loop Progmelt (High= I Low= P)	PI-Loop Filterblo. (High= I Low= P)	PI-Loop Hose (High= I Low= P)	PI-Loop Head (High= I Low= P)	PI-Loop Aux Zone (High= I Low= P)
*System	5	Gear Ratio Motor. 1	Gear Ratio Motor 2	Gear Ratio Motor 3	Gear Ratio Motor 4	Gear Ratio Motor 5	Gear Ratio Motor 6
*System	6	Rpm-Displayn (0/1)	Pump-Clutches (Bit0…Bit5, Bit7)	Level Control (0/1)	Bar/PSI (Bar=0, PSI=1)	Pressure Sensor-type	Active Recipe (1…4)
*System	7	Zone# Premelt 1	Zone# Premelt 2	Zone# Premelt 3	Zone# Premelt 4	Zone# Premelt 5	Zone# Premelt 6
*System	8	Zone# Progmelt 1	Zone# Progmelt 2	Zone# Progmelt 3	Zone# Progmelt 4	Zone# Progmelt 5	Zone# Progmelt 6
*System	9	Zone# Filterblo. 1	Zone# Filterblo. 2	Zone# Filterblo. 3	Zone# Filterblo. 4	Zone# Filterblo. 5	Zone# Filterblo. 6
*System	10	Zone# Hose 1	Zone# Hose 2	Zone# Hose 3	Zone# Hose 4	Zone# Hose 5	Zone# Hose 6
*System	11	Zone# Hose 7	Zone# Hose 8	Zone# Hose 9	Zone# Hose 10	Zone# Hose 11	Zone# Hose 12
*System	12	Zone# Head 1	Zone# Head 2	Zone# Head 3	Zone# Head 4	Zone# Head 5	Zone# Head 6
*System	13	Zone# Head 7	Zone# Head 8	Zone# Head 9	Zone# Head 10	Zone# Head 11	Zone# Head 12
*System	14	Zone# Aux.Zo. 1	Zone# Aux.Zo. 2	Zone# Aux.Zo. 3	Zone# Aux.Zo. 4	Zone# Aux.Zo. 5	Zone# Aux.Zo. 6
*System	15	Zone# Aux.Zo. 7	Zone# Aux.Zo. 8	Zone# Aux.Zo. 9	Zone# Aux.Zo.10	Zone# Aux.Zo. 11	Zone# Aux.Zo. 12
*System	16	Motor# Pump 1	Motor# Pump 2	Motor# Pump 3	Motor# Pump 4	Motor# Pump 5	Motor# Pump 6

Chapter 6
PREVENTIVE MAINTENANCE

Note: Re-read Chapter 1 "Safety Precautions" before performing any maintenance procedures. All maintenance procedures must be performed by qualified, trained technicians.

General Cleaning

The DYNAMELT® M SERIES ASU enclosure is finished with an extremely durable polyurethane paint. The enclosure may be cleaned with a variety of industrial cleaners following manufacturers' directions. To prevent discoloration or deterioration of the ASU's finish, avoid prolonged contact with strong solvents.

The molded plastic handles may be cleaned with mineral spirits.

Preventive Maintenence Schedule

The Dynamelt M ASU requires little maintenance. The hopper is fitted with a coarse screen to prevent large debris from entering the system. Normally this screen does not require cleaning. The ASU parts that require regular, periodic maintenance are as follows:

Outlet Filter

The outlet filter should be replaced monthly during the first few months of operation. After you gain experience with your system, you can determine how often you need to replace it. The outlet filter is located on the outlet filter manifold on the hose connection panel of the ASU. See illustration of the outlet filter on page 6-2.

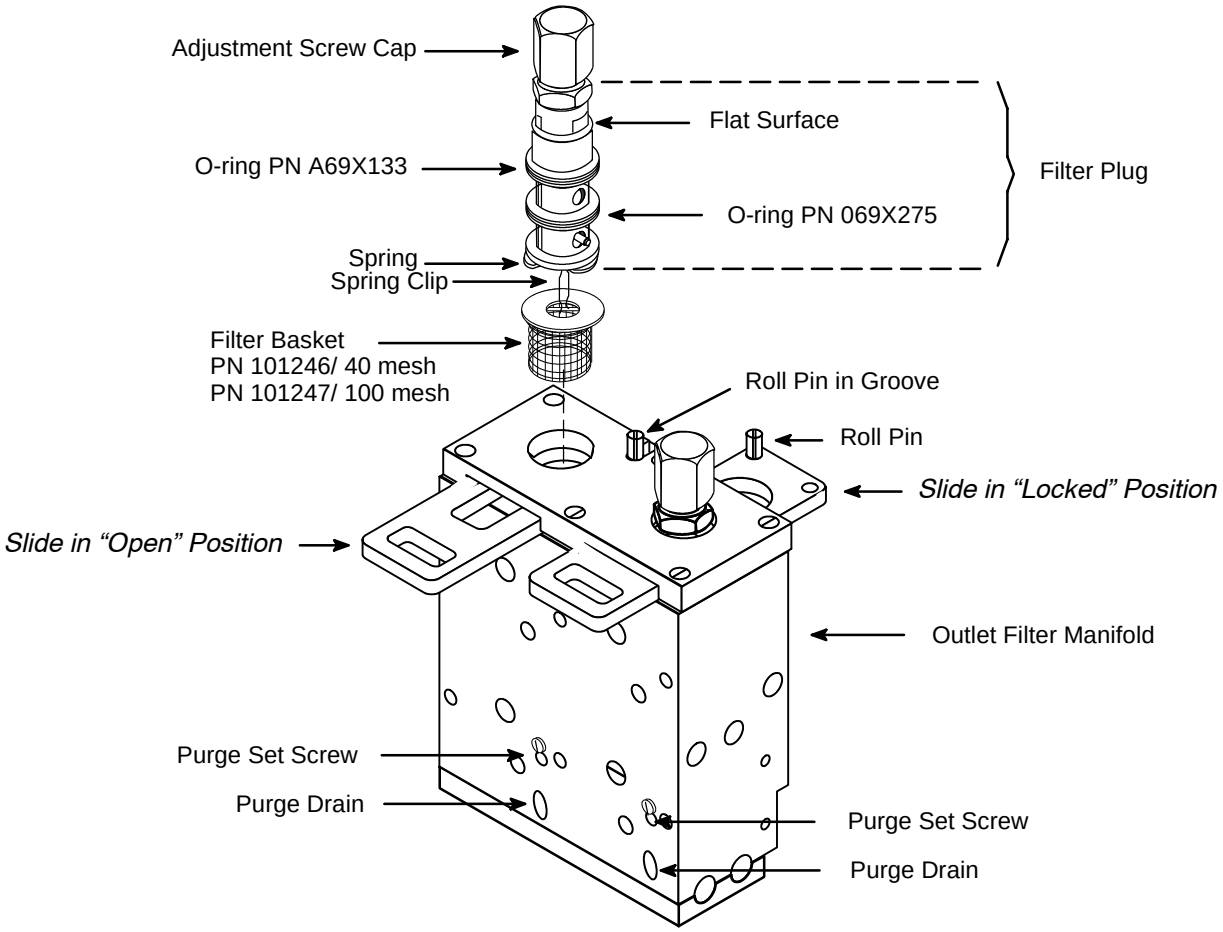
Use the following procedure to replace the outlet filter. *cont.*

WARNING HIGH PRESSURE

Turn the motor OFF and trigger the applicators to relieve adhesive pressure before performing any outlet filter maintenance.

WARNING

Avoid splashing hot adhesive. The filter screen will be covered with hot adhesive and must be handled with proper tools. Position a heat-resistant container under the manifold before proceeding.



Outlet Filter Manifold (located at the Hose Connection Panel)

1. The system should be at operating temperature before starting this procedure.

2. Before proceeding, verify that the motor(s) is turned OFF and the applicators have been triggered to relieve pressure.

3. Remove the Manifold Access Cover by unscrewing one screw. Then lift up and off.

4. Position a heat-resistant container below the manifold. With a hex key screwdriver (allen wrench), slowly loosen the manifold's two purge set screws (do not attempt to remove them). Allow adhesive and pressure to escape out of the manifold. Adhesive will drain into the container.

5. Wearing insulated gloves, push down on the adjustment screw cap with sufficient force to release the slide. While holding the cap down, pull the slide forward until the groove stops the roll pin.
   Note: If the cap moves "up" before the slide opens fully, this is an indication that there is

still pressure in the system. Stop and verify that the motor/ pump is turned OFF and the applicator's valves are open before proceeding. Then repeat step 5.

6. Pull the cap and the filter plug up and out of the filter cavity. Due to adhesive and the o-ring seals, there will be some resitance before the plug exits the cavity.
   Note: the filter basket hangs from the plug by a spring clip. If the filter pulls free of the spring clip and remains in the cavity, use a hooked tool to extract it.

7. Pull the filter basket free from the spring clip. The filter should be inspected and replaced as needed. Note the char and debris inside the filter basket.

8. Before replacing the filter basket, inspect the two o-rings on the filter plug. Replace any cut or damaged o-ring. Apply hi-temp lubricant (PN 001U002) to a new o-ring before installing.

CAUTION: The condition of the lower o-ring (PN 069X275) is especially critical to maintaining system pressure. A cut or scuffed (scratched) o-ring can allow system pressure to escape.

9. Replace or re-install the filter basket onto the spring clip. Push the filter onto the clip. The clip should straddle the wire bar located inside the hole at the top of the filter.

10. Lower the filter basket and the filter plug back into the filter cavity.

11. Position the two flat surfaces at the top of the filter plug parallel to the movement of the slide. The slide will not return to its operating (locked) position unless these flat surfaces are aligned properly. If necessary, twist the plug to align.

12. Re-tighten the two purge screws.

Hose Fittings

All hose fittings should be checked for tightness after every three months of operation.

Fasteners

After the first ten hours of operation, check all set screws, socket head and cap screws for tightness. Thereafter, re-check all fasteners after every three months of operation.

Filter Shutoff Cleaning or Replacement

See the illustrations in Chapter 10 (Melt & Grid Assembly) for location of the filter shutoff assembly.

1. Pump all the adhesive out of the hopper.

2. Lower the temperature of the application system to the adhesive's softening point.

cont.

WARNING HOT SURFACE

The ASU will still be hot for this procedure. Use insulated gloves and protective clothing when removing the filter shutoff.

3. Open the two access doors located at the sides of the ASU. Do not pull out the ground wires attached. The filter shutoff assembly is located on the side of the hopper.

4. Wearing gloves, use a wrench to unscrew the filter shutoff nut and pull the filter shutoff assembly out.

5. a. Replace the clogged filter shutoff assembly, or
   b. Emerse the assembly in flushing fluid (PN L15653) to loosen contaminants. Remove assembly from fluid and use a hot air gun (if necessary) and rags to clean all contaminants from it.

6. Apply a coat of anti-sieze compound onto the threads of the filter shutoff nut before re-inserting into the ASU.

7. Replace the filter shutoff o-ring. Lubricate the new o-ring with lube (PN N07588).

8. When re-installing the filter assembly, turn the filter's cut out hole toward the pump. Align the filter shutoff knob in its "open" position. Note: each filter shutoff is stamped "I" (open) and "0" (closed) to show position.

9. Close the access doors. Restore the ASU to normal operation.

Pump Shaft Leak

There is a cutout in the baseplate, directly below the pump shaft(s), which will allow adhesive from a leaking pump to exit the ASU. Inspect the area under the baseplate cutout every month for adhesive. A leaking pump shaft indicates a worn pump seal. See instructions in Chapter 8 for replacement of this seal.

Summary of Preventive Maintenance Schedule

Monthly (or as experience dictates)

1. Inspect outlet filter basket. Replace as required.

2. *Check for leaking adhesive under the baseplate, caused by a worn pump seal.* Replace as required.

Every Three Months (or as experience dictates)

1. Check all hose fittings for tightness.

2. Check all fasteners for tightness.

3. *Inspect filter shutoff.* Clean or replace as required.

Flushing the System

Contaminated adhesive, accumulation of residue in the system and hopper, or changing the adhesive formulation may require the system to be flushed. To flush the system, have at least 6 liters (1.5 gallons) of flushing fluid on hand (PN L15653) per hopper. Repeat this procedure for each hopper of a dual hopper ASU.

WARNING

The flushing fluid will splash easily. Wear protective clothing, gloves and a face shield to prevent severe burns.

1. Pump out as much of the molten adhesive from the hopper as possible.

2. Reduce the ASU's pump pressure to zero.

Note: the hose used in the following process is merely for the convenience of depositing flushing fluid. This procedure does not have to be repeated for each hose in the system.

3. Disconnect one of the supply hose's adhesive feed from its applicator head. Do not disconnect the electrical power to the head (since that would disable the pump). Put the hose in a secured position within a container which will catch the used flushing fluid.

4. Add flushing fluid to the hopper and allow approximately fifteen minutes for it to reach hopper temperature. Carefully stir the flushing fluid to mix with any adhesive remaining in the hopper.

5. Slowly increase the pump pressure. Pump about half of the fluid through the hopper, pump and adhesive supply hose into the flushing container.

WARNING

Avoid splashing the flushing fluid from the end of the hose.

6. Reduce the pump speed to zero.

7. Remove the outlet filter and replace the basket following the procedures outlined in the "Outlet Filter" section of this chapter.

8. Add new adhesive to the hopper and allow it to reach application temperature.

9. Slowly increase motor speed to the pump.

10. Actuate each of the heads until all the flushing fluid is removed and a steady stream of new adhesive flows.

cont.

11. Re-adjust the pump speed for the desired flow.

12. Re-fill the hopper with adhesive. The system is now ready for production.

Chapter 7
TROUBLESHOOTING

General Troubleshooting Notes

DANGER
HIGH VOLTAGE

WARNING
HOT SURFACE

Dynamelt systems use electrical power that can be life threatening and hot-melt adhesives that can cause serious burns. Re-read Chapter 1 "Safety Precautions" before performing any troubleshooting or repair procedures. All troubleshooting and repair procedures must be performed by qualified, trained technicians.

CAUTION: Printed circuit boards (PCBs) are prone to damage from static electrical charges during handling. Read "Handling Printed CIrcuit Boards" in this chapter before handling or attempting service on Dynamelt's PCBs.

The Dynamelt's DynaControl includes malfunction self-diagnostics, alerts and error indication alarms. The error indication alarms (the alarms displayed on the DynaControl readout) are triggered whenever there is a sensor failure and whenever there is an over-temperature condition. The operation of the error indication alarms is described in Chapter 4 of this manual.

Preliminary Checks: Verify the following before proceeding:

1. The ASU is switched on.
2. The ASU is supplied with power.
3. The ASU is supplied with pneumatic air.
4. Pneumatic and electrical connections are correct.
5. Adhesive is in the hopper.

Error Messages:

See Ch. 4 for complete instructions on Error Alarms and Message**s.**

Sensor Failure on Zone # = temperature zone "#" has an open or shorted sensor.
Overtemperature on Zone # = temperature zone "#" has exceeded setpoint limitation.
Communication Error = indicates a serious problem which requires service by Dynatec.
Hopper Overtemp = hopper temperatures have exceeded their thermostat's setting.

Hose/ Applicator Troubleshooting Tip

Hose or applicator problems can be isolated by electrically connecting the applicator and hose to an alternate socket on the ASU. If the malfunction goes with the applicator and hose, the problem will usually be in the applicator or hose that was moved. If the malfunction does not move with the applicator and hose, the problem is probably in the ASU.

Motor Speed Control PC Board Re-set

Anytime the AC drives's Motor Speed Control printed circuit board must be re-set due to line surges or over-currenting the motor, turn the ASU OFF by the main power switch and wait at least 20 seconds before attempting to re-start. This will allow the pcb to re-set. See the table on page 7-7 to troubleshoot.

High-Temperature Redundant Overtemp Thermostat

The ASU includes a mechanical (redundant) overtemp thermostat that acts as a safety backup. If the ASU's hopper temperature should exceed 232°C (450°F), the thermostat will cause the ASU's circuit breaker to open and power to the hopper and all hoses and heads will be cut off. The mechanical thermostat must be manually re-set after the hopper temperature falls below 204°C (400°F).

The overtemp thermostat is located behind the motor access door (see Chapter 8). To reset: turn OFF the ASU's main power switch, push the center of the thermostat's insulator to re-set, restart the ASU.

Pump Enable Thermostat

The pump enable thermostat is a low-temperature safety feature of the Dynamelt ASU designed to prevent the pump from powering on before the adhesive is molten. It is a cartridge thermostat and it is factory set at 135°C (275°F). The thermostat is adjustable so that operators using adhesives with extraordinarily high or low melting points can tailor the low-temp setting to their production's needs.

To access the pump enable thermostat, follow the instructions given in Chapter 8. Refer to Chapter 3 for instructions on calibration of this thermostat.

Lithium Battery on CPU PCB

The CPU Printed Circuit Board contains a lithium battery which serves no function in the Dynamelt M Series controller configuration.

Lithium Battery on Display CPU PCB

The Display CPU Board contains a lithium battery. The normal life of this battery is about ten years. When the battery needs replacement, the scheduler's clock does not function, but other controller features remain intact. Return the board to ITW Dynatec for battery replacement.

Handling Printed Circuit Boards (PCBs)

The Dynamelt ASU and DynaControl controller utilize several printed circuit boards (PCBs). These boards are extremely sensitive to electrostatic charges. When working near or with any PCBs, the following procedures must be followed to avoid damage to them.

DANGER HIGH VOLTAGE

Before unplugging connectors from the I/O PCBs, ground yourself to the ASU by touching any available unpainted cool metal surface, mounting screws, etc. This will avoid electrical discharge to the PCB assembly when you are removing and replacing connectors.

CAUTION: Printed circuit boards (PCBs) should be handled using the following procedures:

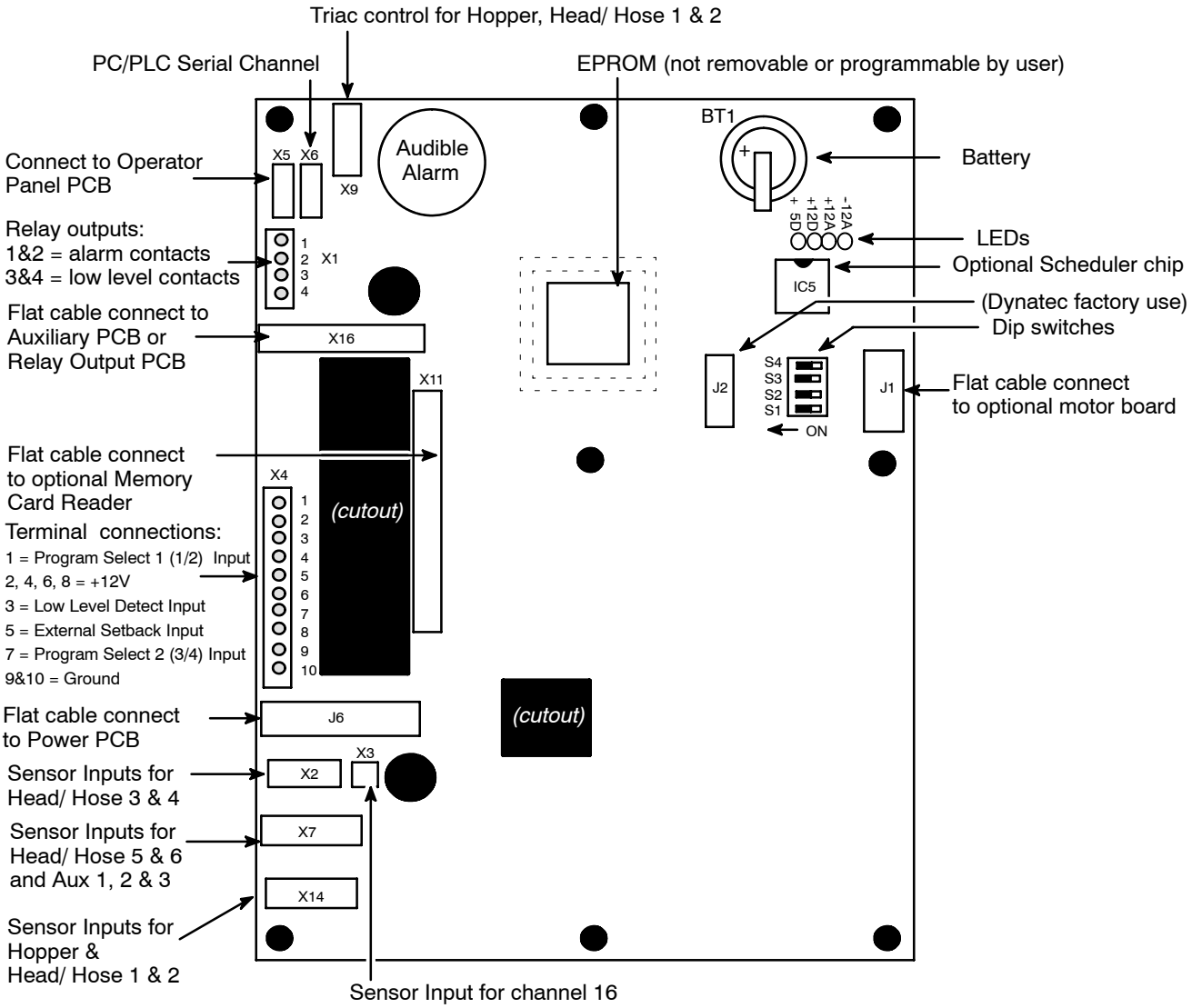
1. **Wear a wrist grounding strap. If a grounding strap is not available, frequently touch a bare metal part of the ASU (unpainted frame, mounting screw, etc.) to safely discharge any electrostatic buildup on your body.**
2. **Handle a PCB by its edges only. Don't grip a PCB across its surface.**
3. **When removed from the ASU, each PCB must be individually packaged inside a metallized, static drain envelope. Do not place the removed PCB on a table, counter, etc. until it has first been placed in or on a static drain envelope.**
4. **When handing a PCB to another person, touch the hand or wrist of that person to eliminate any electrostatic charge *before* you hand the PCB to him.**
5. **When unwrapping a PCB from its static drain envelope, place the envelope on a *grounded, nonmetallic* surface.**
6. **To cushion PCBs for shipment, use only static-drain bubble pack. Do not use foam peanuts or bubble pack not known to be static draining.**

The following pages detail the Dynamelt M Series PCBs.

CPU Printed Circuit Board

The CPU board contains the controller's CPU chip (built into the board) and optional 7-Day Scheduler chip. It also contains the optional Memory Card Reader interface and ribbon cable connection. The CPU chip (EPROM) can only be reprogrammed at ITW Dynatec's factory.

The Low Level relay is fixed at normally open. The High/ Low Alarm relay is fixed at normally closed. During normal operation, the two red indicator lights are always ON.



Layout of Components on CPU Board

Display CPU Printed Circuit Board

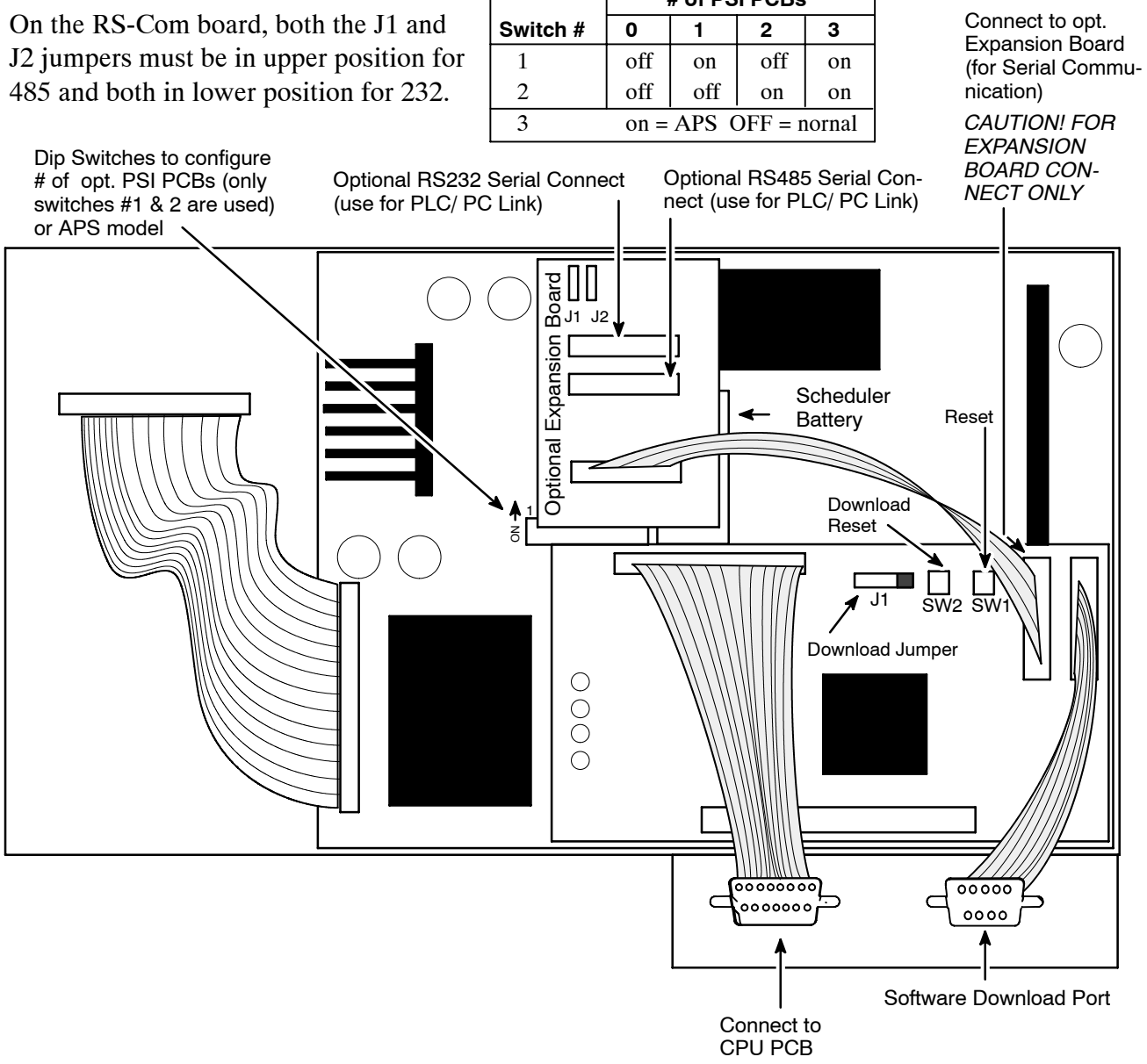
The Display CPU PCB contains the controller's CPU module, scheduler battery, serial ports and optional connections. It is located directly behind the controller's display panel within its mounting bracket (or within the remote pendant assembly (option), if applicable).

When downloading software updates, use the download serial port seen at the lower right of the illustration. While downloading, the J1 jumper is moved temporarily to its #1 position.

To configure the number of (optional) pressure transducers on an ASU, use the dip switches (shown below beneath the expansion board) and the following chart. There are four transducers per PSI PCB and a maximum of three PSI PCBs per ASU. Note: PSI not available on APS models.

On the RS-Com board, both the J1 and J2 jumpers must be in upper position for 485 and both in lower position for 232.

	# of PSI PCBs			
Switch #	**0**	**1**	**2**	**3**
1	off	on	off	on
2	off	off	on	on
3	on = APS OFF = nornal			


Connect to opt. Expansion Board (for Serial Communication)
CAUTION! FOR EXPANSION BOARD CONNECT ONLY
Dip Switches to configure # of opt. PSI PCBs (only switches #1 & 2 are used) or APS model
Optional RS232 Serial Connect (use for PLC/ PC Link)
Optional RS485 Serial Connect (use for PLC/ PC Link)
Optional Expansion Board
J1 J2
Scheduler Battery
Reset
Download Reset
ON
1
J1
SW2
SW1
Download Jumper
Connect to CPU PCB
Software Download Port

Layout of Components on Display CPU PCB

Motor Control Interface Printed Circuit Board

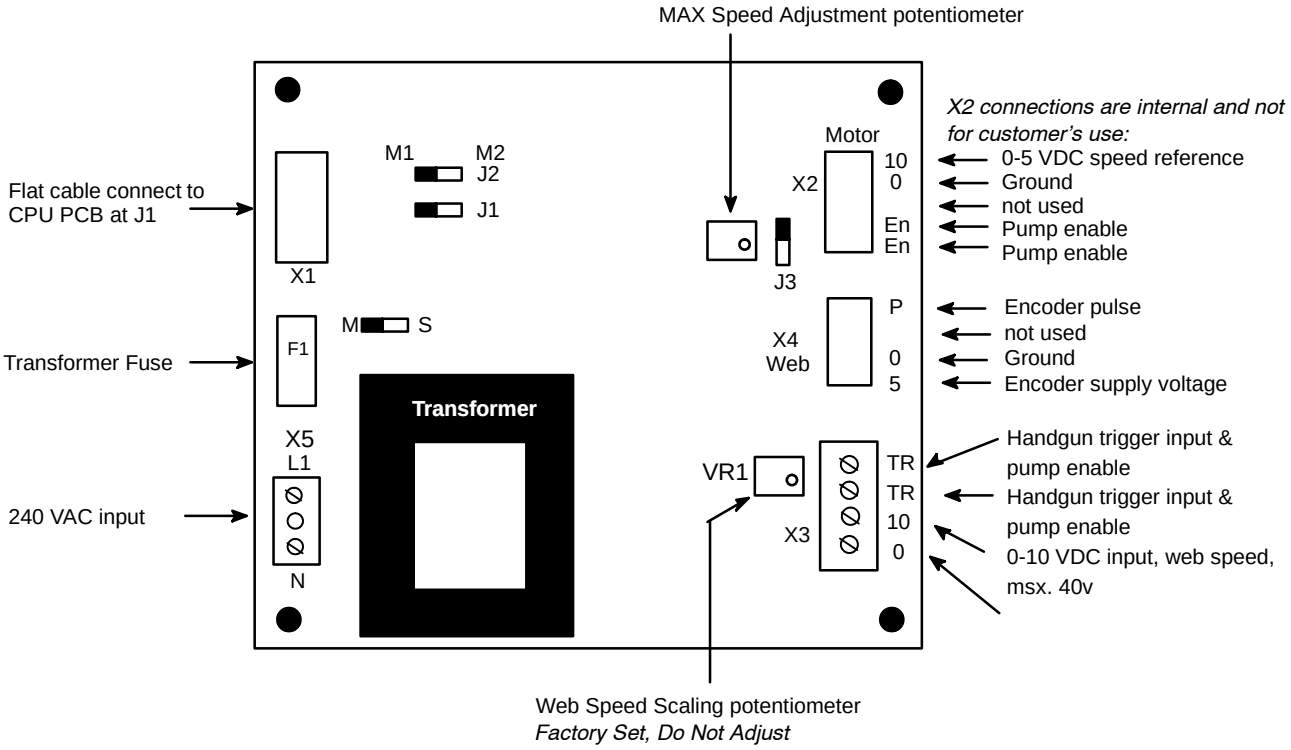
For each motor on the ASU, there is a Motor Control Interface PCB and a Motor Speed Control PCB. The Motor Control Interface PCB (diagrammed below) connects directly to the CPU PCB. The Motor Speed Control PCB (diagrammed on the following page) connects via a spade connector to the Motor Control Interface PCB. Up to two motor's pcbs may be connected to one CPU PCB.

Each Motor Control Interface PCB's jumpers should be set as follows: the J1 and J2 jumpers should always be set in the M1 position diagrammed below for motor #1, #3 and #5. For motor #2, #4 and #6, jumpers J1 and J2 are set in the M2 position (opposite from those diagrammed below). The M/S selection jumper must be set in the "M" position. The J3 jumper is always set as shown below.

"MAX" speed adjusting pot: This pot adjusts the maximum output voltage of the motor speed control board. It is factory preset to full pump motor rpm (100%). Normally, this pot does not need adjustment. Turning clockwise increases the voltage. To verify adjustment, set the motor to "manual" mode and to 100% speed. Then adjust the pot to desired maximum speed (±5%).

NOTE: Do not attempt to use the MAX pot adjustment to trim the line speed to a given value. Proper automatic line speed following is accomplished with correct motor programming into the controller (see Chapter 5).

"ENCODER" connections: the optional Digital RPM Readout's encoder is installed onto these board connections.



Layout of Components on Motor Control Interface Board

Motor Speed Control Printed Circuit Board

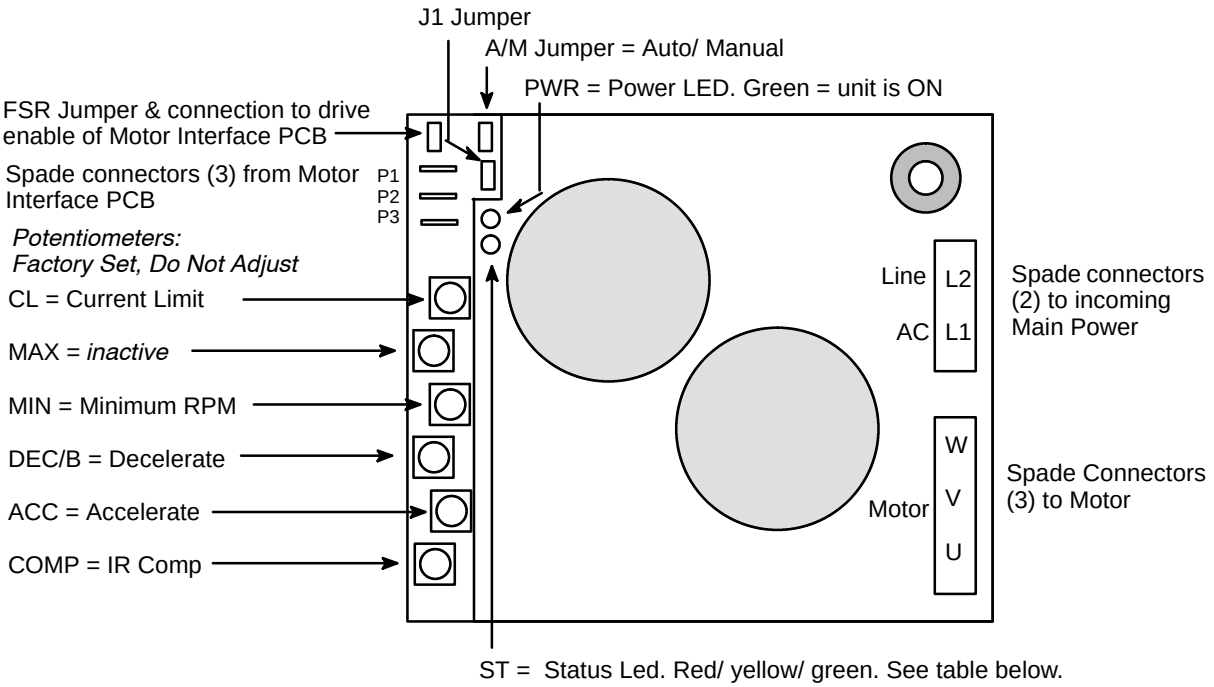
The Motor Speed Control PCB is connected to the Motor Control Interface Board via spade connctors P1 and P2. P3 is not used.

The three jumpers (FSR, J1 and A/M) are factory set, do not change. The J1 jumper is always set in the upper position. The A/M Jumper is always present.

“CL” adjusting pot: The current limit (CL) adjustment will limit the maximum current available to the AC pump motor during overload. This will protect the motor from damage. The setting is factory set to deliver 100% of the rated horsepower for the ASU. When the motor load exceeds the current limit value, the Status LED (light) will illuminate red (indicating an overload condition). Turning clockwise increases the current limit value; turning counter-clockwise decreases it. The current limit is factory preset, so no adjustment is necessary.

“ACC” and “DEC/B” adjusting pots: These pots change the time required for the pump motor to accelerate (ACC) or de-accelerate. Turning full counter-clockwise equals 0.3 seconds. Turning full clockwise equals 20.0 seconds. Factory default for either pot is 10.0 seconds.

cont.



ST LED Color	*State*	*Function*	*ST LED Color*	*State*	*Function*
Green	Slow Flash	Normal Operation	Red/Yellow	Quick Flash	Undervoltage
Red	ON	Current Limit	Red/Yellow	Slow Flash	Overvoltage
Red	Quick Flash	Overload	Yellow	ON	Stop
Red	Slow Flash	Short Circuit			

Layout of Components on Motor Drive Board

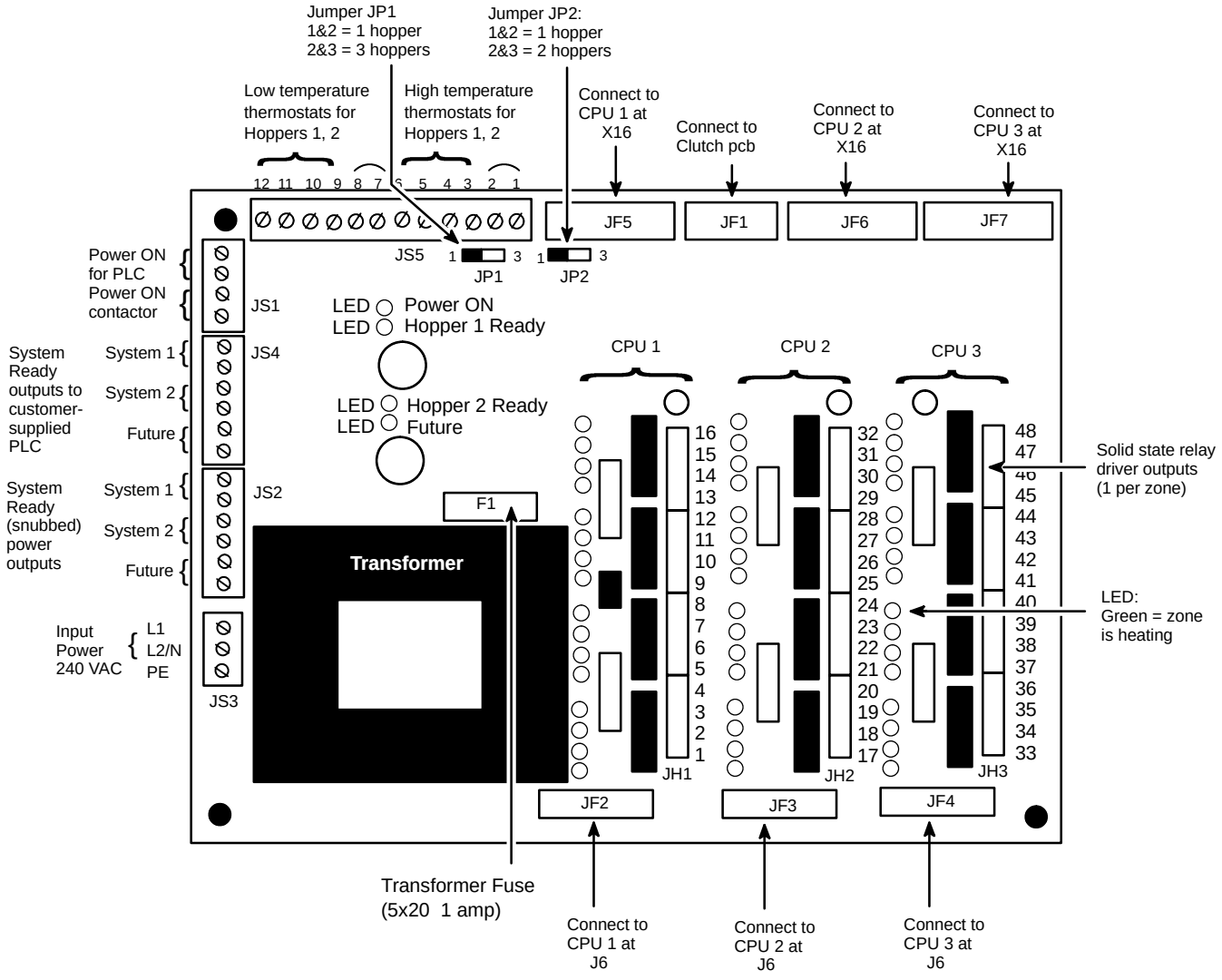
“MIN” adjusting pot: This pot adjusts the minimum speed of the pump motor when it is enabled. The pot is factory preset to exactly zero RPM when the speed setting is 0.00% full scale. Turning clockwise increases the minimum RPM above zero RPM when the motor is enabled. This adjustment can be utilized to “creep” the motor (also referred to as “auto preload”) so that positive adhesive pressure is always maintained in the system.

48-Zone Power Printed Circuit Board

The 48-Zone Power PCB has the capacity to monitor adhesive temperatures for multiple hoses, applicators, hoppers and auxillary zones.

The LEDs for each temperature zone (1 through 48 illustrated below) will flash on and off as their heaters output to maintain setpoint temperature. The Power On and Hopper LEDs will light continuously once the hopper(s) are up to temperature.

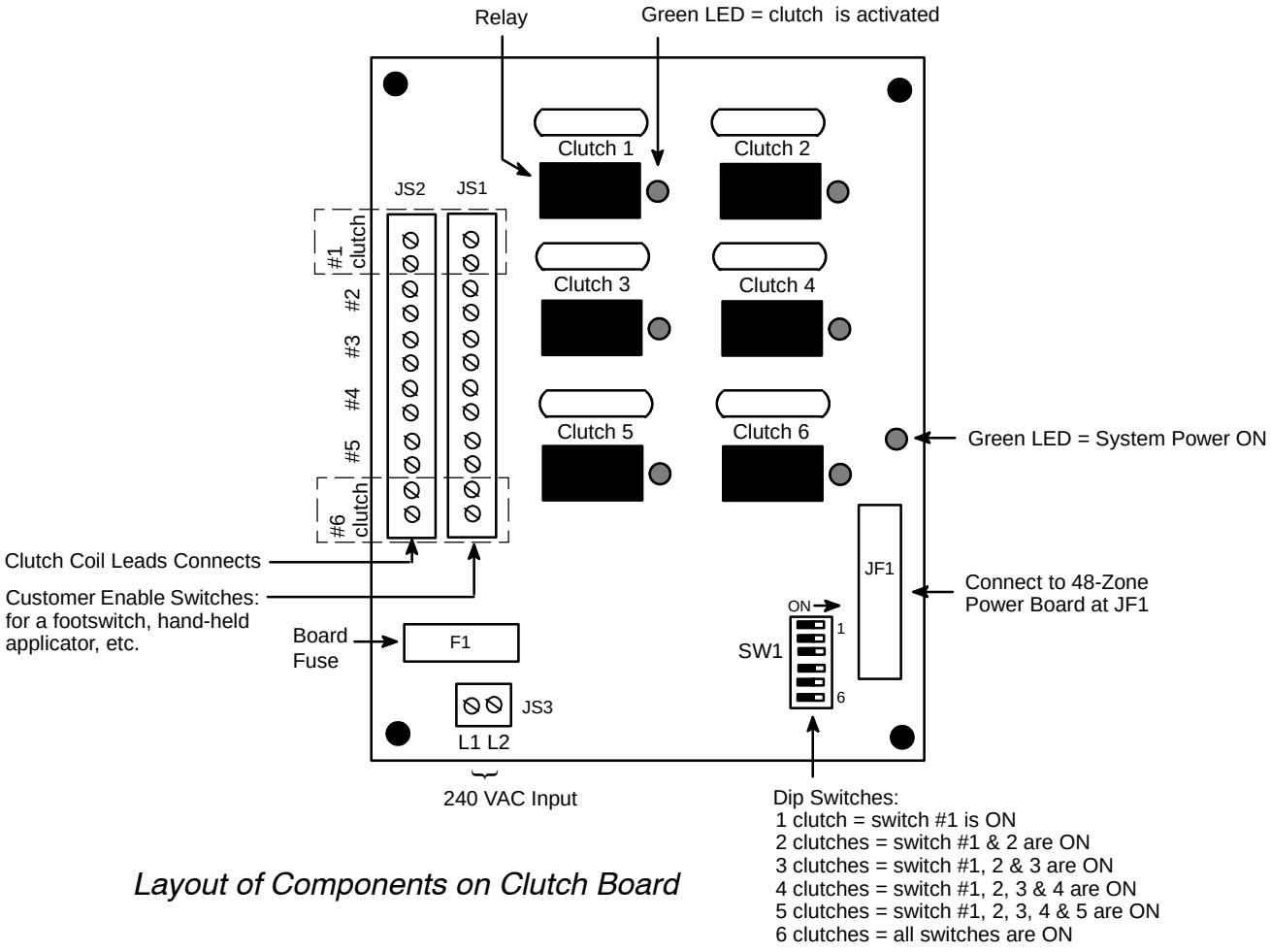
The settings of the JP1 and JP2 jumpers correspond to the number of hoppers on the ASU. For an ASU with one hopper, both jumpers must be set to position 1-2 (shown). For two hoppers, JP1 must be set at 1-2 and JP2 must be set at 2-3.



Layout of Components on 48-Zone Power Board

Optional Clutch Printed Circuit Board

The Clutch PCB allows installation of up to six (optional) clutches on the ASU.
The dip switches (SW1) are turned ON to reflect the number of clutches on the system.



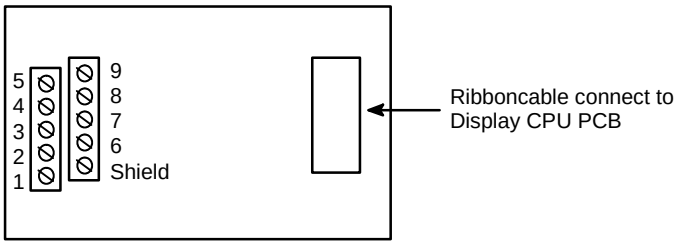
Layout of Components on Clutch Board

Optional RS232/485 Printed Circuit Board

Pin Configuration:

RS232	*RS485*
2 RxD	3 TxB
3 TxD	4 TxA
5 Gnd	8 RxB
S Shield	9 RxA
	S Shield

(Pins not listed are not used)



Layout of Components on Communication Board

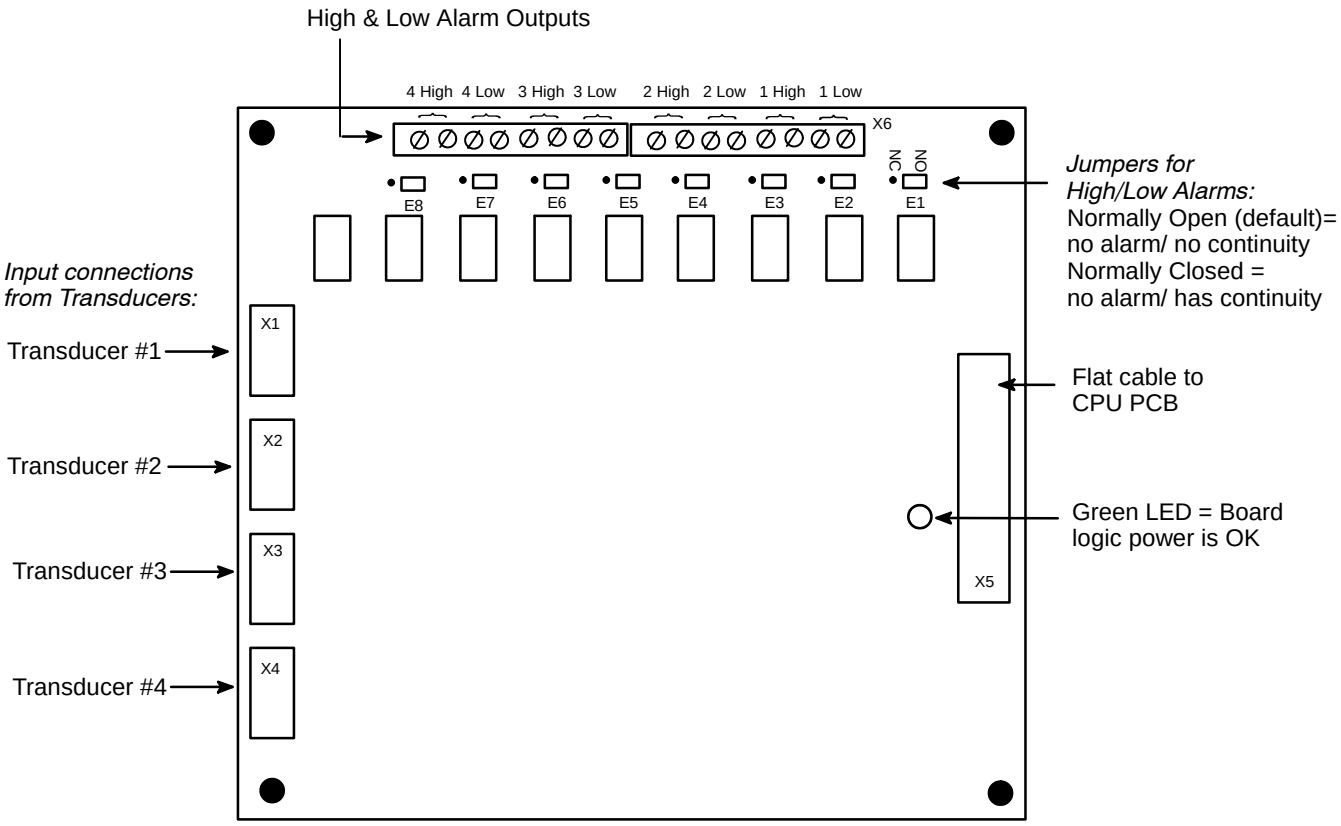
Optional Pressure (PSI) Printed Circuit Board

Each Pressure (PSI) PCB on the ASU allows the controller to monitor up to four pressure transducers. The DM35 ASU can accept one PSI PCB (four transducers), the DM70/140 ASUs can accept up to two PSI PCBs (up to eight transducers) and the DM210 ASU can accept up to three PSI PCBs (up to 12 transducers). Each CPU board can accomodate one PSI PCB.

The 8 pairs of terminals at the top edge of the board (as seen below) are for the high and low alarm outputs of the relays. The eight jumpers for the high/ low alarm output relays (E1 thru E8) are factory set to Normally Open (default) and are illustrated below in default position.

The leads from the pressure transducers are connected at the left of the board (as seen below).

Note: the quantity of pressure transducers on an ASU is configured at the dip switches on the Display CPU PCB.



Layout of Components on Pressure Board

Heater and Sensor Resistance Values

The resistance values given in the four tables on the following page will aid in troubleshooting when a sensor or heater malfunction is suspected. The “Temperature Sensor Resistance” table gives values for various temperatures. If you know the approximate temperature of the suspected sensor, you can check to see if the sensor resistance approximates the value given in the table by unplugging the affected head or hose connection and measuring resistance across the affected pins (see wiring diagram in Chapter 11 for pin numbers).

DANGER HIGH VOLTAGE

Disconnect input power to the application system before disconnecting/ re-connecting electrical connections. Make sure there is no electrical power on the leads you will be connecting.

The “Nominal Hose Heater Resistance” table gives the heater resistance for hoses. A suspected hose heater problem can be quickly isolated by measuring hose heater resistance and comparing it to the correct resistance for your hose length and voltage as shown.

The “Nominal Head Heater Resistance” table gives values for several different head wattages. A suspected head heater problem can be isolated by measuring head heater resistance and comparing it to the resistance for the appropriate wattage of your system.

The “Nominal Hopper Heater Resistance” table gives heater resistance for the hopper heaters of each Dynamelt M Series model and for the (optional) drop-in grids.

The “Nominal Filter Manifold Heater Resistance” table gives heater resistance for the heater located in the (optional) filter manifold/ pressure relief block. The heater inside the manifold varies depending on the number of filter manifolds mounted on the ASU, therefore resistance varies also.

Temperature °F	Temperature °C	Resistance in Ohms
32	0	100
50	10	104
68	20	108
86	30	112
104	40	116
122	50	119
140	60	123
158	70	127
176	80	131
194	90	135
212	100	139
230	110	142
248	120	146
268	130	150
284	140	154
302	150	157
320	160	161
338	170	164
356	180	168
374	190	172
392	200	176
410	210	180
428	220	183

Temperature Sensor Resistance
(0.00385 PT 100 RTD)

Hose Length Meters	Hose Length Feet	Resistance in Ohms
1.2	4	323-358
1.8	6	201-223
2.4	8	155-172
3	10	120-133
3.7	12	102-114
4.9	16	75-84
7.3	24	51-57

Nominal Hose Heater Resistance
for DynaFlex Hoses

Watts	Resistance in Ohms
200	288
270	213
350	165
500	115
700	82

Nominal Head Heater Resistance

Note: Resistance is measured at ambient temperature (20°C/ 68°F).

Model :	M35	M70/ 140	M210
Qty. Hopper Heaters	1	2	3
Max. # of Drop-in Grids	2	4	6
Resistance (Ohms) for each Hopper Heater	11.5	11.5	11.5
Resistance (Ohms) for each Drop-in Grid Heater	23	23	23

Nominal Hopper Heater Resistance in Ohms

# of Filter Manifolds on ASU	Model: M35	M70/ 140	M210
1	115.2	115.2	115.2
2	51.6	51.6	51.6
3	not available	38.4	38.4
4	not available	28.8	28.8
5	not available	not available	TBD
6	not available	not available	186

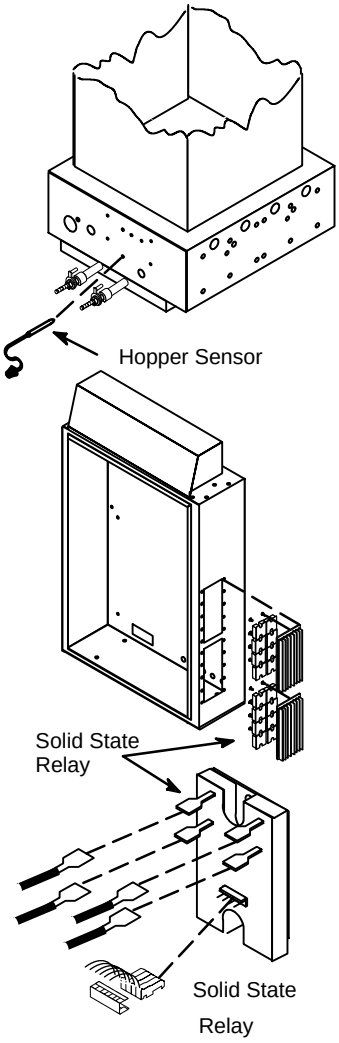
Nominal Filter Manifold Heater (optional) Resistance in Ohms

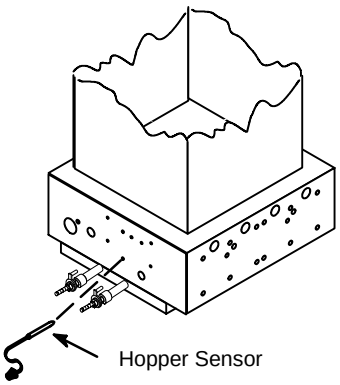
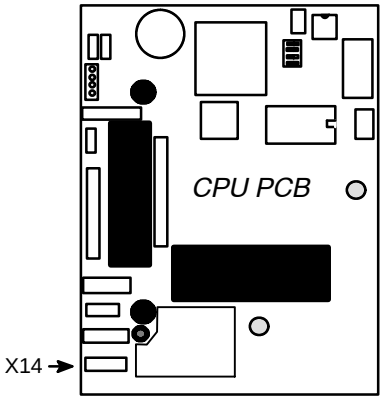
Error Indication Alarm Troubleshooting Guide

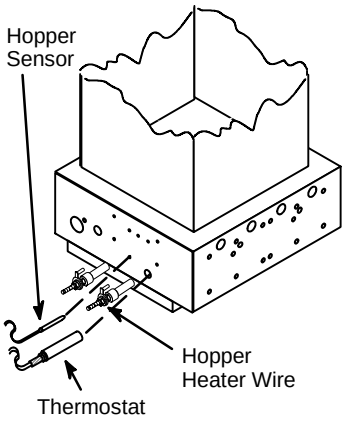
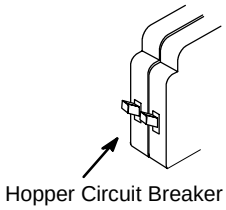
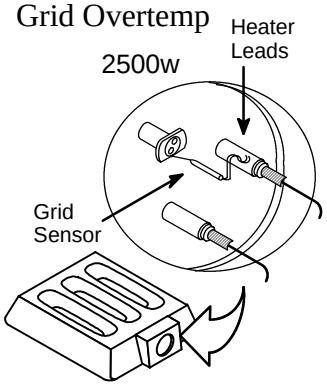
The operation of error indication alarms is described in Chapter 4. When checking for correct equipment operation in the following guide, be aware that all heaters will go off immediately after an error indication alarm occurs if the operator takes no action. With the exception of the fuses, there are no user-replaceable parts on the printed circuit boards. If there is a non-fuse failure on any of the PCBs, the PCB must be replaced.

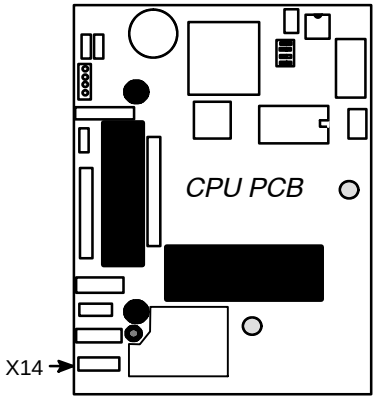
DANGER HIGH VOLTAGE

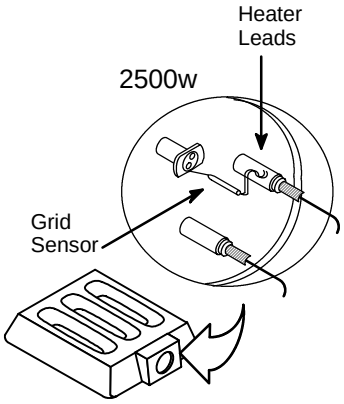
Some of the procedures in the following Troubleshooting Guide require potentially dangerous electricity to be present. Only qualified service personnel should perform these procedures.

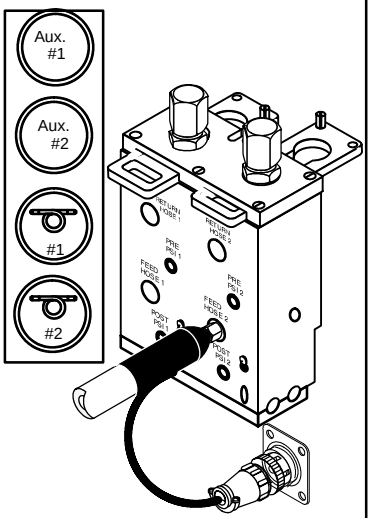
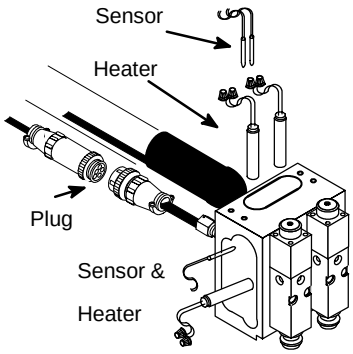
Problem	Possible Cause	Solution
Hopper (tank) Overtemp 	1. Setpoints have been programmed without enough deviation. 2. Hopper sensor inoperative. 3. Hopper control solid state relay inoperative.	1. Re-program setpoints, allowing a larger deviation between the high and low limits. 2. Replace hopper sensor if resistance does not comply with the resistance table in this chapter. 3. a. Verify that the relay is not shorted by removing all of its output wires and verifying that resistance is greater than zero. b. Verify condition of relay by disconnecting, then re-connecting properly. Then, when Temperature Zone is OFF, use a VOM AC voltmeter to verify that 240 volts are not present at the heater terminal.

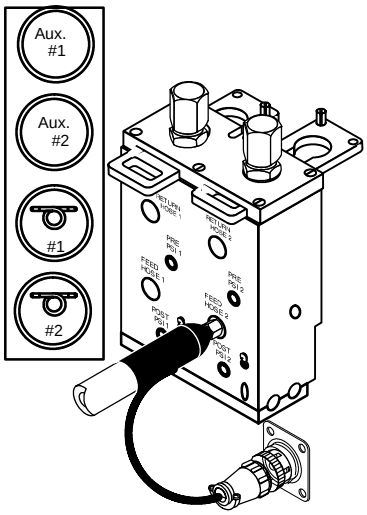
Problem	Possible Cause	Solution
Hopper Sensor Open 	1. Sensor cable has become unplugged from CPU PCB	1. Verify that hopper sensor cable is properly connected on X14 on the CPU PCB.
	2. Inoperative hopper sensor.	2. Replace hopper sensor if resistance does not comply with resistance table in this chapter.
Hopper Sensor Short 	1. Short-circuit caused by debris where sensor plugs into CPU PCB.	1. Verify that sensor plug is clean and correctly connected on X14 on the CPU PCB.
	2. Pinched sensor lead wire.	2. Visually inspect sensor lead wire for break, kink, damage, etc. If no obvious damage, use an ohmmeter to measure continuity from the sensor lead to the plug at the CPU PCB. Repair or replace any damaged wire.
	3. Inoperative hopper sensor.	3. Replace hopper sensor if resistance does not comply with resistance table in this chapter.

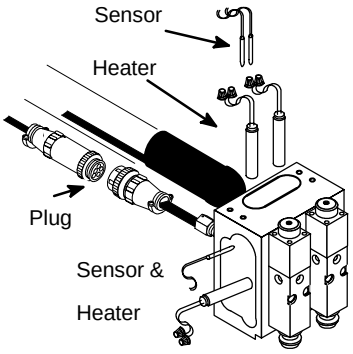
Problem	Possible Cause	Solution
Hopper Heater Open  	1.Disconnection in hopper heater circuit. 2. Disconnection between Power PCB and CPU PCB. 3. Hopper circuit breaker tripped. 4. Open hopper heater element. *NOTE A:* DM70/140 models may have up to two hopper heaters. *NOTE B:* DM210 models may have up to three hopper heaters.	1. Inspect hopper heater wiring for proper connections. 2. Verify that all connections are properly made on the CPU PCB. 3. Refer to the schematic in Chapter 11 to locate the hopper circuit breaker. If it is tripped, do not re-set it without checking for causes. Visually and electrically inspect for a short-circuit to ground in the hopper heater circuit. This will be limited to between the hopper control relay and the hopper heater. 4. At the terminal rail: use an ohmmeter to measure resistance across H3A and N (380v) or across H3A and H3B (240v). See the resistance table in this chapter for normal resistance values. Infinitely high reisistance values indicate an open heating element which must be replaced. If the ASU has a second heater, measure this heater's resistance across H15A and N (380v) or across H15A and H15B (240v) as outlined above. If the ASU has a second heater, see Note A. If the ASU has a third heater, measure this heater's resistance across H27A and N (380v) or across H27A and H27B (240v) as outlined above.
(Optional) Drop-in Grid Overtemp 	1. Setpoints have been programmed without enough deviation. 2. Grid sensor inoperative.	1. Re-program setpoints, allowing a larger deviation between the high and low limits. 2. Examine grid sensor assembly for intermittent break in sensor lead. Remove sensor bulb from grid. Replace grid sensor if resistance does not comply with the resistance table in this chapter.

Problem	Possible Cause	Solution
	3. Grid control solid state relay inoperative.	3. Use a clamp-on ammeter to monitor current. Replace inoperative solid state relay.
(Optional) Drop-In Grid Sensor Open	1. Sensor cable has become unplugged from CPU PCB.	1. Verify that grid sensor cable is properly connected at X14 on the CPU PCB.,
	2. Disconnection between Power PCB and the CPU PCB.	2. Verify that all connections are properly made on the CPU PCB.
	3. Drop-in grid sensor inoperative.	3. Replace sensor if resistance does not comply with the resistance table in this chapter.
(Optional) Drop-in Grid Sensor Short	1. Short-circuit caused by debris where sensor plugs into CPU PCB.	1. Verify that sensor plug is clean and correctly connected at X14 on the CPU PCB.
	2. Pinched sensor lead wire.	2. Visually inspect sensor lead wire for break, kink, damage, etc. If no obvious damage, use an ohmmeter to measure continuity from the sensor lead to the plug at X14 on the Power PCB. Repair or replace any damaged wire.
	3. Drop-in grid sensor inoperative.	3. Replace sensor if resistance does not comply with the resistance table in this chapter

Problem	Possible Cause	Solution
(Optional) Drop-in Grid Heater Open	1. Disconnection in grid's heater circuit.	1. Inspect grid's heater wiring for proper connections.
	2. Disconnection between Power PCB and solid state relay.	2. Verify that the Power PCB is properly connected to the solid state relay.
	3 Drop-in grid circuit breaker tripped.	3. Refer to the schematic in Chapter 11 to locate the grid's circuit breaker. If it is tripped, do not re-set it without checking for causes. Visually and electrically inspect for a short-circuit to ground in the grid's heater circuit. This will be limited to between the grid's control relay and the grid's heater.
	4. Open drop-in grid heater element. *NOTE:* The DM35 ASU may have 1 or 2 grids. The DM70/140 ASU may have from 1 to 4 grids. The DM210 ASU may have from 1 to 6 grids.	4. At the terminal rail, use an ohmmeter to measure resistance as follows: For 1 grid: H1A & N (380v) H1A & H1B (240v) For 2nd grid: H2A & N (380v) H2A & H2B (240v) For 3rd grid: H13A & N (380v) H13A & H13B (240v) For 4th grid: H14A & N (380v) H14A & H14B (240v) For 5th grid: H25A & N (380v) H25A & H25B (240v) For 6th grid: H26A & N (380v) See the resistance table in this chapter for normal resistance values. Infinitely high reisistance values indicate an open heating element which must be replaced.

Problem	Possible Cause	Solution
Hose/ Head (No.) Overtemp Note: Vertical configuration is for DM 35 only. Larger ASUs are arranged horizontally. 	1. Hose/ Head setpoints incorrectly programmed. 2. Inoperative or shorted hose/ head triac or dual solid state relay. 3. Disconnection between the Power PCB's and the CPU board's flat cables. 4. Hose/ Head sensor circuit inoperative. 	1. Re-program setpoints to allow a larger deviation. 2. Refer to the schematic in Chapter 11 to locate the correct head/ hose triac or relay. Use a clamp-on ammeter to monitor hose/ head current. If current does not cycle on and off, then the triac or relay has failed and must be replaced. 3. Verify that all PCBs are properly mounted inside the panel box. 4. a. Visually examine socket connection where hose/ head attaches to ASU. Verify that pins are properly seated. If pins or plug housing are damaged, repair or replace hose. If socket is damaged, repair or replace harness. b. If hose-to-ASU plug and socket are okay, hose may have intermittent short or open circuit. Repair or replace hose, hose harness or Power PCB as appropriate. Alternately, problem can be isolated by connecting the effected hose to a different ASU hose socket to tell whether the problem is in the hose or in the Power PCB. c. If head-to-hose and hose-to-ASU plugs and sockets are okay, head sensor may have an intermittent short or open circuit. Examine connections inside the service block area of the head and monitor head sensor resistance with an ohmmeter while flexing sensor leads. Repair or replace as appropriate.
Hose/ Head (No.) Sensor Open	1. Disconnection between hose and ASU.	1. Visually examine connection where hose plugs into ASU socket for proper contact and seating. If pins or housings are damaged, repair or replace hose or hose harness (in ASU).

Problem	Possible Cause	Solution
Note: Vertical configuration is for DM 35 only. Larger ASUs are arranged horizontally. 	2. Hose sensor harness unplugged from Power PCB. 3. Disconnection between the Power PCB's and the CPU PCB's flat cables. 4. Hose/ Head sensor circuit inoperative.	2. Verify that effected hose is properly connected to Power PCB. Replace or repair damaged hose harness as necessary. 3. Verify that all PCBs are properly mounted inside the panel box. 4. Replace head sensor if resistance does not comply with resistance table in this chapter. Use hose schematic to check hose sensor at ASU socket. Repair or replace hose, hose harness or Power PCB as appropriate.
Hose/ Head (No.) Sensor Short	1. Debris at connection between hose/ head and ASU. 2. Hose/ Head sensor circuit inoperative.	1. Visually inspect hose plug and ASU socket for cleanliness and proper contact and seating of pins. 2. a. Using the hose schematic, check hose sensor resistance at ASU socket. An ohmmeter can be used to isolate a pinched wire in the hose harness. When cause is isolated, replace hose, hose harness or Power PCB as appropriate. b. If head-to-hose and hose-to-ASU plugs and sockets are okay, head sensor may have an intermittent short or open circuit. Examine connections inside the service block area of the head and monitor head sensor resistance with an ohmmeter while flexing sensor leads. Repair or replace as appropriate.

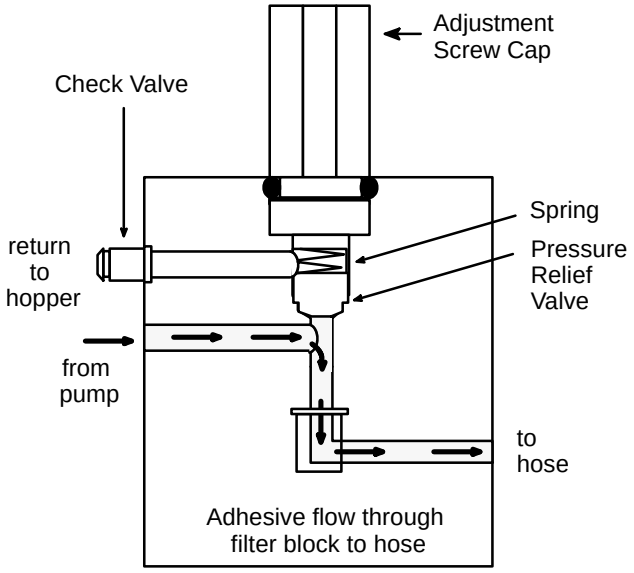
Problem	Possible Cause	Solution
Hose/ Head (No.) Heater Open	1. Disconnection between hose/ head and ASU.	1. Visually examine effected hose plug and ASU socket for cleanliness and proper contact and seating. Refer to the wiring diagram for pin identification. The problem can be isolated by plugging the effected hose/ head into another ASU socket. If the new hose number is then displayed as malfunctioning, the problem is in the hose that was moved. Repair or replace hose, head or ASU hose harness as appropriate.
	2. Disconnection between solid state relay and Power PCB or inoperative relay.	2. Check connection. Verify that solid state relay is operative: check schematic in Chapter 11 for relay location. Use a clamp-on ammeter to monitor hose/ Head current. If current does not cycle on and off, the relay has failed and must be replaced.
	3. Disconnection between cartridge heater and cable assembly inside head.	3. Visually inspect wiring inside head. Verify that cartridge heater leads are properly connected in the service block area.
	4. Inoperative hose/ head circuit breaker.	4. Refer to schematic in Chapter 11 for location of circuit breaker. If it is found to be tripped, do not re-set it without first finding cause. Visually inspect and use an ohmmeter to check for a possible short circut to ground in the hose/ head heater circuit.
	5. Open hose/ head heater element.	5. Use an ohmmeter to measure hose/ head heater resistance. See resistance table in this chapter for resistance values. Infinitely high resistance indicates an open heater element.
	6. Open wiring inside ASU.	6. Visually inspect ASU wiring and use an ohmmeter and the wiring diagram to locate open wires in head heater circuit. Repair or replace ASU hose head harness or other ASU wiring as necessary.

Adjustable Adhesive Pressure Relief Valve

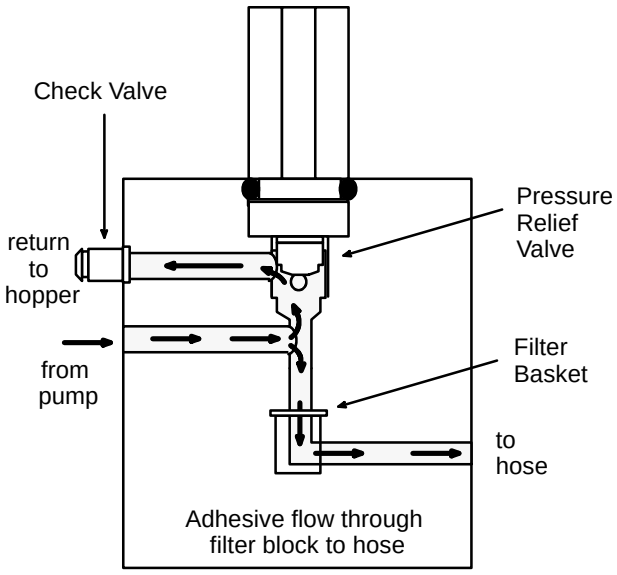
Dynamelt pumps are outfitted with a high-pressure relief valve located on the outlet filter manifold. The valve is adjustable and it does not affect adhesive pressure under normal operating conditions. The adjustable pressure relief valve is factory set at 34 bar (500 psi) for Dynamelt M gear pumps.

When adhesive pressure exceeds the set limit, the pressure forces the valve to move away from its seat, compressing the spring and allowing adhesive to flow back to the hopper. This adhesive flow reduces pressure. When the pressure falls below the set limit, the spring forces the valve against its seat, cutting off adhesive flow. The check valve, seen below, is not instrumental in pressure relief. It serves as an overflow valve, preventing adhesive from flowing out of the hopper when the filter plug is removed.

Normally Closed (Unrelieved):
In the drawing below, the pressure relief valve is closed.

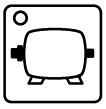


Open (Relieved):
In this drawing, pressure has exceeded the setting of the valve, causing it to open and discharge adhesive to the hopper.



Operation of the Adjustable Adhesive Pressure Relief Valve

Operation of the ASU's Gear Pump



Manual or Automatic Pump Operation

Choose "Manual", "Stop" or "Automatic" gear pump operation via the "Motor" pushbutton (see icon above) on the controller's keypad. When the Dynamelt's pump is to be operated manually (that is, without a line following signal), the manual mode is used to control pump speed (and adhesive output). For the gear pump to be operated in the automatic mode, a tach generator, or equivalent (attached to the parent conveyor line) must be provided and the following set-up procedure should be performed:

1. The tach generator or the signal isolator must be adjusted so that the voltage from the speed controller is 0 to 10 VDC (but not more than +10 VDC when the conveyor is at maximum speed). This voltage is measured at either X3 on the Motor Control Interface PCB (for a tach generator) or at terminals 9 (+) and 10 (-) of the Signal Isolator Board.

2. The "Automatic" setting then changes pump speed for any given 0 to +10 VDC incoming tachometer signal. Voltage will vary given production speed.

The motor speed can be adjusted (trimmed) in automatic mode by setting maximum and minimum percent of full speed values on the controller's keypad. MAX % of Full Speed will be the true motor speed at 10 volts input. This value cannot exceed 100%.

To make the motor speed adjustment, follow the programming instructions in Chapter 5.

Pump Output Adjustment

When the adhesive in the ASU's hopper has reached a temperature high enough for the pump to operate safely, the controller will place the hopper in "Ready" condition and power will be supplied to the pump. The pump is self-priming.

Pump output is adjusted by the motor speed control on the controller's keypad. However, if less pressure is needed, maximum pressure of the pump can be decreased (or increased) by adjusting the pressure relief valve installed on the pump output manifold. To change the setting of this valve, refer to instructions in Chapter 3.

The relief valve is factory set at 34 bar (500 psi) for Dynamelt M gear pumps.

Troubleshooting the ASU's Gear Pump

No special tools are needed for working on the ASU pump. See Chapter 8 of this manual for diaassembly/ assembly procedures for the ASU pump, and Chapter 10 for locating pump parts on the component illustrations (exploded-view drawings).

Gear Pump Priming/ Start-Up

The pump is self priming.

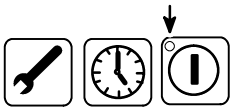
CAUTION: DO NOT continue to run the pump if no glue is coming out. This could damage the pump since it uses the glue as a lubricant. Stop and troubleshoot.

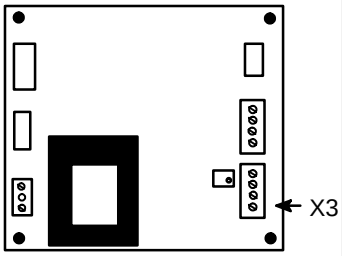
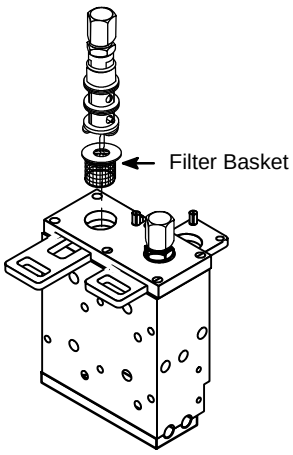
Gear Pump Troubleshooting Guide

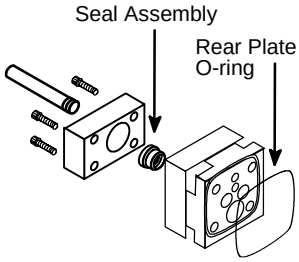
WARNING HOT SURFACE & ADHESIVE

Some of the procedures in the following Troubleshooting Guide require working near hot adhesive. Be sure to wear protective gloves, safety glasses and clothing and use proper tools for handling hot melt components.

Note: Each motor and Motor Interface PCB in the system can run independently (or dependently). Each Motor Interface PCB may have its own operating parameters. Therefore, each motor and Motor Interface PCB should be troubleshot independently.

Problem	Possible Cause	Solution
Pump doesn't operate in "Manual" mode, power light doesn't light. ON/OFF Led 	1. Motor On/Off is OFF at the controller keypad.	1. Check keypad setting.
	2. Hopper temperature is below ready setpoint.	2. Pump cannot operate until hopper has reached "ready" condition. Verify that hopper has reached ready. Re-program hopper operating setpoint and ready setpoint if necessary.
	3. No incoming electrical power.	3. Check to see if ASU temperature control is operating. If not, check for presence of incoming supply voltage.
Pump doesn't operate in "Manual" mode, power light is ON, hopper is at "ready" condition.	1. "Manual" motor is set at zero (at the keypad).	1. Re-program motor.
	2. If pump On/Off is being controlled by a remote switch (i.e., a hand-held, applicator), the switch or switch circuit may be open.	2. Check condition of the remote switch (the hand-held applicator).
	3. Low temp alarm.	3. Verify that ASU is warmed up and that hopper temperature is above the factory-set pump enable temperature.
	4. Faulty Motor Control Interface Board.	4. If the board is faulty it must be replaced.

Problem	Possible Cause	Solution
Pump doesn't operate in "Auto" mode, power light is ON, hopper is at ready conditon.  Motor Control Interface PCB	1. Parent machine is not running.	1. Check parent machine.
	2. "Auto" motor is set at zero (at controller keypad).	2. Re-program motor.
	3. No incoming line following signal.	3. Check for presence of 0 to 10 VDC control signal at X3 of Motor Control Interface PCB. If signal is not present, check connection at X3 and tachometer drive connections. If control signal is present there, the problem is within the ASU.
	4. Internal ASU connections or Motor Control Interface PCB inoperative.	4. Check for the presence of 0 to 10 VDC control signal at X3 of Motor Control Interface PCB. Check ASU connections (S1 & S2). If the signal is not present, the problem is in the connection. If the signal is present there, the problem is most likely a faulty Motor Control Interface Board.
	5. System is not ready, temperatures are too low.	5. Verify that ASU is warmed up and that hopper temperature is above the low temperature thermostat.
Pump runs but there is no adhesive output.	1. ASU is out of adhesive.	1. Add adhesive to hopper.
	2. If pump has been serviced and leads reversed, pump will run with no output.	2. Check pump wiring to schematic.
Low or inconsistent adhesive output.  	1. Filter(s) clogged.	1. Remove and inspect filter basket and primary filter.
	2. Adhesive used is too viscous.	2. Verify that system components are at appropriate temperatures and that the selected adhesive is correct for the application.
	3. Clogged hose.	3. Inspect hose for kinks or internal plugs of debris or char. Clean or replace hoses as necessary.
	4. Clogged applicators.	4. Inspect applicators for plugged nozzles or filters. Clean or repair applicators as necessary.

Problem	Possible Cause	Solution
	5. The fixed pressure relief valve is opening.	5. When fully closed (clockwise) and all applicators are off, adhesive pressure should be around 34 bar (500 psi). If it is significantly less, the pressure relief valve should be replaced.
	6. Inoperative lower o-ring in filter plug is allowing pressure to escape.	6. Replace o-ring. Follow diagram and instructions in Chapter 6 for "Outlet Filter" to locate the o-ring.
Adhesive leak at pump shaft seal.  	1. Pump seal is incorrectly positioned inside the seal and bearing assembly.	1. Remove seal and bearing from pump. Verify that all components are correctly positioned.
	2. Pump seal inoperative.	2. Remove seal from pump, inspect it and replace it if worn or damaged. Be sure there are no burrs or other sharp edges on pump shaft or on installation tools that could damage a new seal.
Adhesive leak at pump-to-hopper interface.	1. O-ring in pump's rear plate is inoperative.	1.Remove seal from pump, inspect it and replace it if worn or damaged. Be sure there are no burrs or other sharp edges on the rear plate o-ring groove that could damage a new o-ring.
	2. Pump assembly screws are missing or loose.	2. Verify that all four pump screws are tightly assembled to the hopper.
	3. Helicoil insert pulled out of hopper.	3. Remove pump and inspect hopper. Repair or replace hopper as necessary.

Chapter 8
DISASSEMBLY & RE-ASSEMBLY PROCEDURES

Note: Re-read Chapter 1 "Safety Precautions" before performing any disassembly procedures. All disassembly and repair procedures must be performed by qualified, trained technicians.

Disassembly Procedures

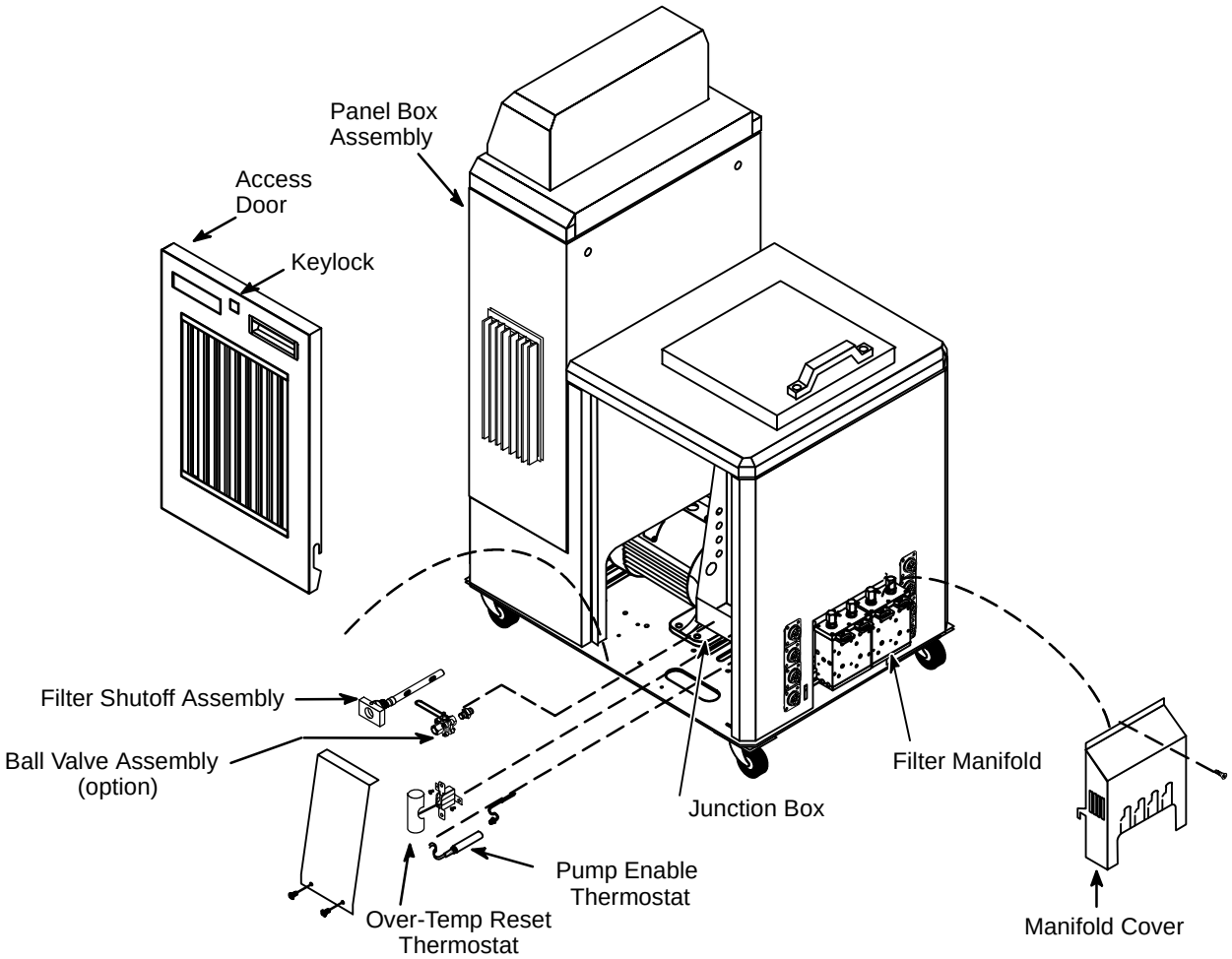
Note: Use the exploded-view drawings referenced with each procedure in conjunction with the instructions outlined in this chapter. Read the "cautions" on page 8-4 before re-assembling the ASU.

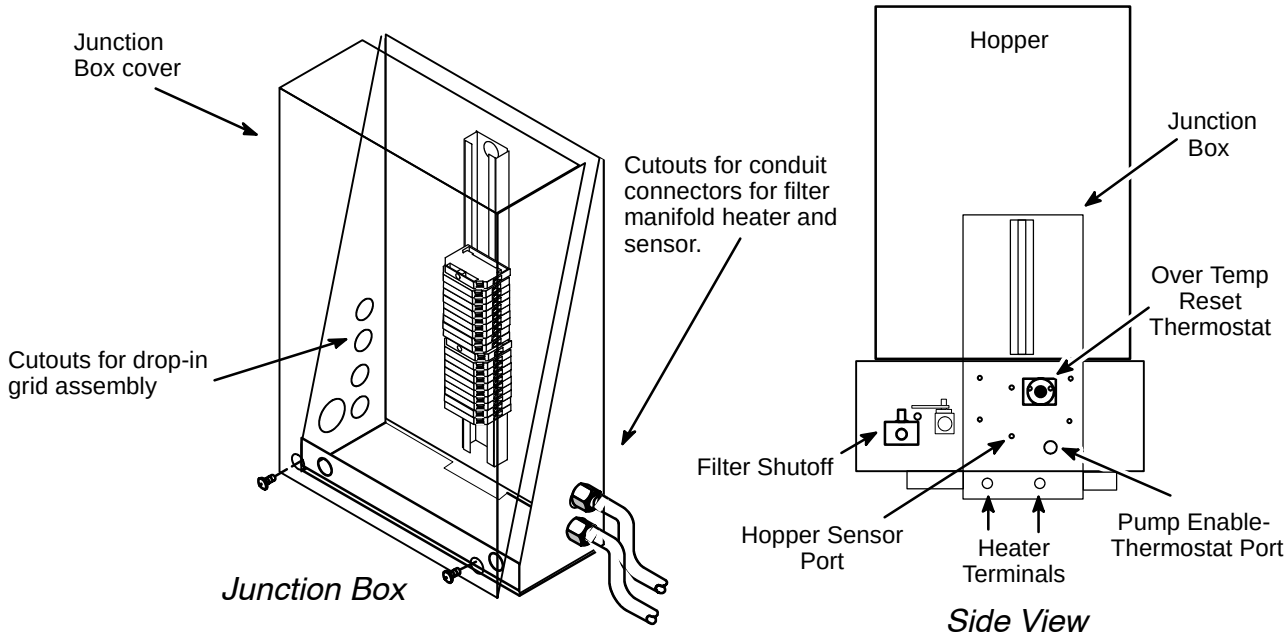
To Remove the Access Doors

There are two access doors, one on either side of the ASU. Use the key to unlock the door, then lift it off, being careful not to pull off the ground wire attached. Remove the ground wire and re-attach when the door is re-installed. These doors allow access to: the motor, pump, junction box, (optional) drop-in grids, filter shutoff and (optional) ball valve.

To Open Junction Box

The junction box is on the right-hand side of the hopper. Within the juction box are the thermostats, heater terminals and the hopper sensor. The junction box cover is removed via the two screws at the bottom of the cover.





Sensor or Thermostat Replacement

Remove the junction box cover.

a. **Over-Temperature Thermostat Replacement:** Remove the two screws and slip the terminals and the hopper ground wire off of the thermostat before removing the thermostat from the base of the hopper.

b. **Pump Enable Thermostat Replacement:** Disconnect two wires from the terminal strip and slide the thermostat out.

c. **RTD Sensor Replacement:** Disconnect two wires from the terminal strip and slide the sensor out.

To Remove the Manifold Cover

Unscrew its captive screw and slide cover up and off. Cover allows access to the hose connections on the filter manifold, outlet filters, heaters and the pressure relief.

Heater Replacement

One heater is located in the heater plate underneath the hopper:

Remove the access door. Use a hex head socket wrench to remove the six heater plate bolts through the holes drilled in the base plate. Disconnect the heater wires. Slide the old heater plate out. Connect heater wires to new plate. Slide new plate in place and fasten with the six bolts.

One cartridge heater is located under the filter manifold:

At the rear of the ASU, remove the filter manifold cover. Remove the cover located at the end of the heater retainer plate (4 screws). Disconnect heater wires from the terminal rail. Loosen the heater retainer plate and slide the cartridge heater out.

To Access the RTD Sensor in the Optional Drop-in Grid

Remove the access door. Remove the screws on the drop-in grid's junction box cover in order to remove the cover. Disconnect the sensor from the terminal strip inside the junction box and slide the sensor out of its adapter.

To Access Electrical Components inside the Panel Box

Verify again that the main power is OFF. On the outside of the panel box, use the main disconnect switch to open panel box door (see Chapter 3 for instructions for opening door).

a. **Fuse Replacement:** Fuses are located in the upper right corner of the inside of the panel box assembly. The following printed circuit boards are fused: Motor Control Interface, Power I/O and the optional Clutch board.

b. **Printed Circuit Board Replacement:** Reference the section entitled "Handling Printed Circuit Boards" in Chapter 7. The PCBs are located in the panel box assembly. Refer to detailed layout in Chapter 3.

The PCBs snap into and out of their standoffs. To remove: place your fingertips under one corner of the PCB and pull out firmly from the standoff. Repeat for each corner of the PCB.

Note: aside from fuses and the Lithium battery on the M Series CPU PCB (see Chapter 7), there are no replaceable parts on the PCBs.

To Access the Pump or Motor

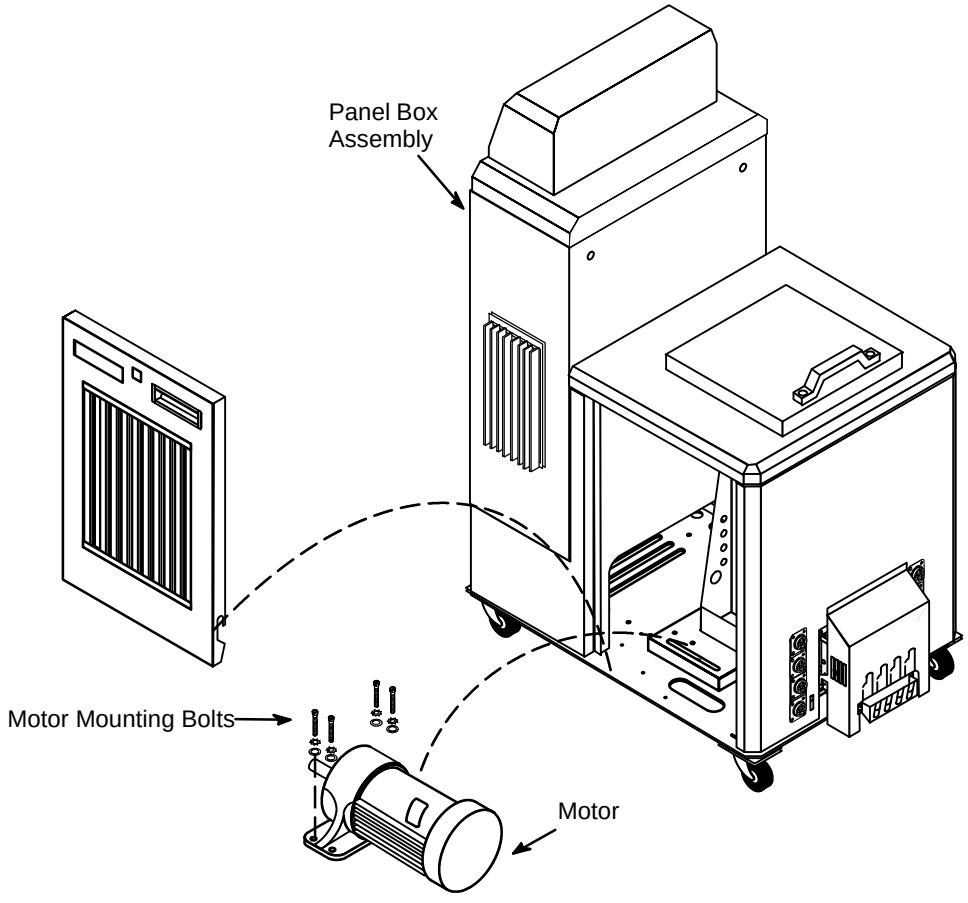
DANGER HOT SURFACE & HIGH VOLTAGE

If the pump is not operable but the heating system will function, raise the temperature of the application system to the operating temperature to aid in the pump disassembly process. Otherwise, a heat gun or other controlled heating method is recommended to melt hardened hot melt material. Never use a torch or an open flame on any of the components of the application system. Once the system is up to temperature, disconnect all incoming power before proceeding.

Remove access door(s) using the key, being careful not to pull off the ground wires attached. Turn OFF the filter shutoff valve by turning it to its closed "0" position.

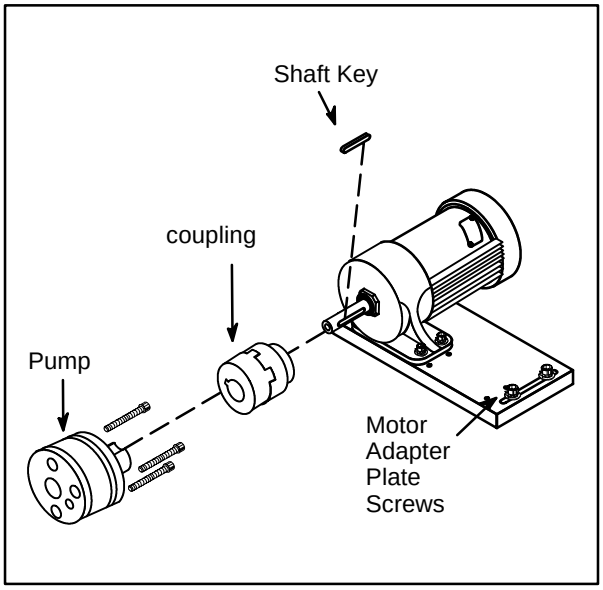
a. **Motor Removal:** Disconnect the wires leading to the motor. Unscrew the hex nut on the cord grip. Slide the wires through the fitting. Remove the four bolts which attach the motor to the mounting bracket. Slide the motor out of the ASU.

For re-assembly: torque should be approximately 1.8 Nm (16 foot/lbs) at room temperature. With hopper at 177°C (350°F), the maximum allowable torque on screws is 4.1 Nm (36 foot/lbs).



b. **Pump Removal:** Verify that the filter shutoff is in its closed "0" position. Loosen motor adapter plate screws and slide adapter plate with motor away from pump and coupling. Slide the coupling off the pump shaft. Remove the four pump mounting bolts.

c. **Pump Seal (O-ring) Replacement:** Remove the pump from the ASU (see instructions above, "b"). Remove the external pump seal from its groove on the back of the pump adapter plate (this is the seal located between the adapter plate and the hopper). Install the new seal.



Re-Assembly Procedures

Unless noted, the M Series ASU's re-assembly is simply the reverse sequence of the disassembly procedures. However, the following precautions should be followed (whenever they apply) for proper re-assembly:

WARNING HOT SURFACE

It order to protect personnel and equipment, it is important to replace all insulation whenever it is removed from the ASU.

CAUTION: In general, all *O-RINGS AND SEALS* should be replaced whenever hot-melt equipment is re-assembled. All new o-rings should be lubricated with o-ring lube (PN N07588).

CAUTION: *TAPERED PIPE THREADS* are found on air line fittings used with the pump air supply (if applicable) and on the outlet filter manifold. Apply thread sealant (PN N02892) whenever tapered pipe threaded parts are re-assembled.

CAUTION: *SOME FITTINGS* used for adhesive on the ASU have straight threads and o-ring seals. Use of thread sealant is not necessary with these parts, but the o-ring seals should be clean and lubricated. Tighten straight-threaded parts and fittings until their shoulders are firmly seated against the pump body (or other surface). Excessive torque may damage straight-threaded parts and the use of power wrenches is not recommended

CAUTION: *HOT-MELT RESIDUE* should be cleaned from parts before they are re-assembled, particularly from threaded parts. As a precaution against adhesive residue preventing proper re-assembly, threaded parts should always be re-tightened at operating temperature.

Chapter 9
AVAILABLE OPTIONS & ACCESSORIES

Pressure Gauge Assembly PN 805641

An optional analog pressure gauge can be mounted on the outlet filter manifold. Reading the adhesive pressure at the manifold, rather than in-line on a hose, allows for more precise monitoring of system pressure. It is also useful for troubleshooting and maintenance.

The gauge is installed at one of the adhesive ports on the manifold. Fittings and adapter are included in the assembly.

Pre-PSI & Post-PSI Transducers PN 800225; Transducer Assembly PN 108825

A pressure transducer is an electronic probe that allows the melted adhesive's pressure to be processed by the ASU's control system. They are used to monitor system operating pressures and their limits. The Pre-PSI transducer measures adhesive pressure in the filter manifold *before* the filter basket. The Post-PSI transducer measures the pressure *after* the filter basket. By comparing the two readings, the operator can determine if the filter basket is clogged.

Drop-in Grids PN 104802

The drop-in grid is an extra heated grid(s) which is installed near the bottom of the ASU's hopper. The additional grid(s) allows faster melting of adhesive for applications requiring higher melt rates and higher volumes of adhesive. When installed, the drop-in grid becomes an auxiliary temperature zone on the controller.

High-Temperature Heater Groups

More accurate temperature control may be gained by using a High-Temp Heater Group in the filter manifold/ pressure relief block. A heater and sensor are contained inside the block and become their own temperature zone on the controller. Six groups are available depending on the number of filter manifolds on the ASU.

Filter Options and Accessories:

40 Mesh Outlet Filter PN 101246

Some situations do not call for a fine mesh outlet filter. A "clean" adhesive or one with a long pot life are examples. Systems utilizing lower temperatures or systems running in a clean environment can also utilize a 40 mesh filter. Standard equipment on Dynamelt is a 100 mesh filter (PN 101247).

Level Control PN N08122

This device informs the operator, via a message on the DynaControl's readout, that the hopper's adhesive level is low. It may also be wired to stop production, turn on an alarm light or signal, or signal a PLC.

Baseplate Standoff PN 109585

When casters are not desired on the ASU, baseplate standoffs may be used to make the unit stationary. The standoff features a flange on its bottom to allow spot welding and it is open in the center to allow bolt-through mounting.

Pump Options and Accessories:

Gear Pumps

For higher tolerances and precision, several gear pumps are available for the Dynamelt. Gear pumps give better service for continuous applications or applications which require more control over the volume of adhesive pumped. Gear pumps available are:

Single Pumps:

PN 100860: 1.54 cc/rev single, standard accuracy gear pump
PN 100861: 3.2 cc/rev single, standard accuracy gear pump
PN 100862: 4.5 cc/rev single, standard accuracy gear pump
PN 109690: 10 cc/rev single, standard accuracy gear pump
PN 108875: 8.5 cc/rev single, high accuracy gear pump
PN 084E374: 0.584 cc/rev single, high accuracy gear pump
PN 084E376: 1.752 cc/rev single, high accuracy gear pump
PN 084E428: 0.297 cc/rev single, high accuracy gear pump
PN 084E430: 1.168 cc/rev single, high accuracy gear pump
PN 084E434: 2.920 cc/rev single, high accuracy gear pump

Dual Pumps:

Note: all dual pumps require PN 102049, see below.
PN 100863: 1.54 cc/rev dual, standard accuracy gear pump
PN 100864: 3.18 cc/rev dual, standard accuracy gear pump
PN 084E389: 0.584 cc/rev dual, high accuracy gear pump
PN 084E432: 1.168 cc/rev dual, high accuracy gear pump
PN 108874: 2.920 cc/rev dual, high accuracy gear pump

Feinpruf Gear Pumps

Feinpruf pumps are commonly used in the European marketplace.

Gear Pump Repair Kit PN 103151

Contains the following items needed to repair the PNs 100860 thru 100864 gear pumps:

PN	Description	Qty.	PN	Description	Qty.
N00198	O-ring	2	069X064	O-ring	3
018X031	Ball Bearing	5	078F017	Ring, Clip	4
069X061	Seal	1	078I001	Key, Woodruff	1

Gear Motor Options

Lenze DC Motors PN 103843

These European 1/4 hp motors are equipped with tachometer feedback and a closed loop control. They are required for the Actual Digital RPM Readout option.

DC Motors PN 101418

These 1/4 hp American motors are rated at 83 rpm, 180v.

Return (re-circulating) Hoses

Available on all models. Use of return hoses allows higher adhesive pressures from the head to the substrate because the head is "overfed" adhesive. The overflow adhesive is re-circulated to the hopper.

Electric Clutch PN 105729; Clutch Kit PN 107945

An electric clutch is available for the Dynamelt M35 ASU**.** A clutch relieves adhesive pressure quickly in applications where there are periods of time when adhesive is not being applied.

DynaControl Options:

Pendant Control Panel PN 107643

The pendant control option gives the DynaControl keypad mobility via a 9 meter (30 ft), 6 meter (20 ft) or 3 meter (10 ft) cable. The Pendant Control Panel replaces the standard display panel.

Pressure Display PN 108388

The pressure board option enables the controller to read and display adhesive pressure PSI values in the outlet filter manifold. The option consists of a PSI printed circuit board which is used with a pressure reading device (transducer or gauge) mounted on the filter manifold.

Actual Digital RPM Readout PN 107946

This option provides a controller readout for actual motor or pump revolutions per minute. No additional programming is necessary. Installation on an encoder is required.

System Status Lights PN 104280

Remote monitoring of system status is made easier with this tri-color light. The stack light is mounted on a 6"x 6" box, which is itself mounted on a stand with a 10' cable. Wired into the controller, the lights illuminate to indicate "Power On", "Ready" and "Alarm". An audible signal accompanies the "Alarm" light. The alarm may be wired to indicate either high/low temperature, low adhesive level or open/short sensor.

Line Speed Tracking Options

Line speed tracking is a standard feature of the M Series ASUs which allows the speed of the motor and ASU to follow the speed of a production line via a reference voltage input. When operated as the standard feature, a 0-10v signal from a PLC or a similar line speed output device is utilized. However, it may also be operated utilizing one of the following optional devices:
PN 015D050 Tach Generator: a mechanically operated device which produces a reference voltage that allows the ASU's gear pump to track a parent machine's production line speed.
PN N06642 Signal Isolator: a device which conditions a parent machine's production line's DC speed reference voltage to allow the ASU's gear pump to track line speed.

Serial Communication (PC Link/ Remote I/O Interface) PN 108475

Bi-directional data transfer to a remote computer is available for the controller. The ASU's standard RS232 serial port connection allows remote interface up to 50 meters from the DynaControl controller. The RS485 serial port connection offers remote interface over a much longer distance. Either connection enables all system parameters to be monitored and/ or controlled from the remote station.

Ethernet/ IP Adapter Kit: PN 112224

This kit adapts the DMM ASU for an Ethernet network so that all system parameters can be transmitted and received, allowing full remote operation of the ASU.

Recommended Service Parts List

Category	Part No.	Description	Qty.
Electrical:	103184	Fuse GDC4 (terminal rail)	4
	048I016	Fuse KTK 15 (terminal rail)	2
	102762	Fuse, 1 amp (motor control interface pc board)	5
	108566	Fuse, T6.3AL 5x20, fast (pc boards)	5
	036B103	RTD Sensor, PT	1
	104166	Over-Temp Thermostat & Insulator Assy.	1
	036B015	Pump Enable Thermostat	1
	102411	Boot, Insulator	1
	048H384	Solid State Relay, Dual	8
	036A170	Heater, 500w (for 1 filter block)	1
	036A079	Heater, 1000w (for 2 filter blocks)	1
	109857	CPU Printed Circuit Board, V5	1
	108256	Control Assy. (w. PCB)	1
	107440	48-Zone Power (I/O) PC Board	1
	106149	Auxiliary RTD PC Board (optional)	1
	106395	Motor Speed Control AC Drive Board	1
	110090	Motor Control Interface PC Board	1
	107438	Optional Clutch PC Board	1
	106147	Optional Pressure PC Board	1
O-rings:	N00181	O-ring 014 (outlet filter/ manifold)	8 + 6 per manifold
	A69X133	O-ring 124 (outlet filter/ manifold)	2 per manifold
	N00185	O-ring 018 (outlet filter/ manifold)	2 per manifold
	N00187	O-ring 020 (outlet filter/ manifold)	2 per manifold
	069X275	O-ring 122 (outlet filter/ manifold)	2 per manifold
	N00199	O-ring 114 (outlet filter/ manifold)	2 per manifold
	103770	O-ring 5-005 (outlet filter/ manifold)	2 per manifold
	103771	O-ring 5-254 (outlet filter/ manifold)	2 per manifold
	807729	Pump Shaft Seal (Zenith/ TSHA pump models)	2 per pump
	069X061	Pump Shaft Seal (optional ITW Dynatec pumps)	2 per pump
	see IBOM	Pump Adapter O-rings	1 of ea. per pump
Filters:	101247	Filter Basket, 100 mesh	2 per manifold
	101246	Filter Basket, 40 mesh (optional)	2 per manifold
	109482	Filter Basket, 200 mesh (optional)	2 per manifold
	105967	Filter Shutoff Assembly, Left	1
Misc:	N07588	Lubricant, O-ring	2
	L15653	Kit, Flushing Fluid, 1 gallon	1
	001U002	Hi-Temp Lubricant, tube	1
	102717	Check Valve (pressure relief)	1
	101340	Motor Brushes, Baldor (optional DC motor)	2 per motor
	106313	Motor Brushes, Lenze (optional Lenze motor)	2 per motor
	108012	Filter/ Pressure Relief Plug Assembly	1

Chapter 10
COMPONENT ILLUSTRATIONS & BILLS OF MATERIAL

WARNING

All parts must be periodically inspected and replaced if worn or broken. Failure to do this can affect equipment's operation and can result in personal injury.

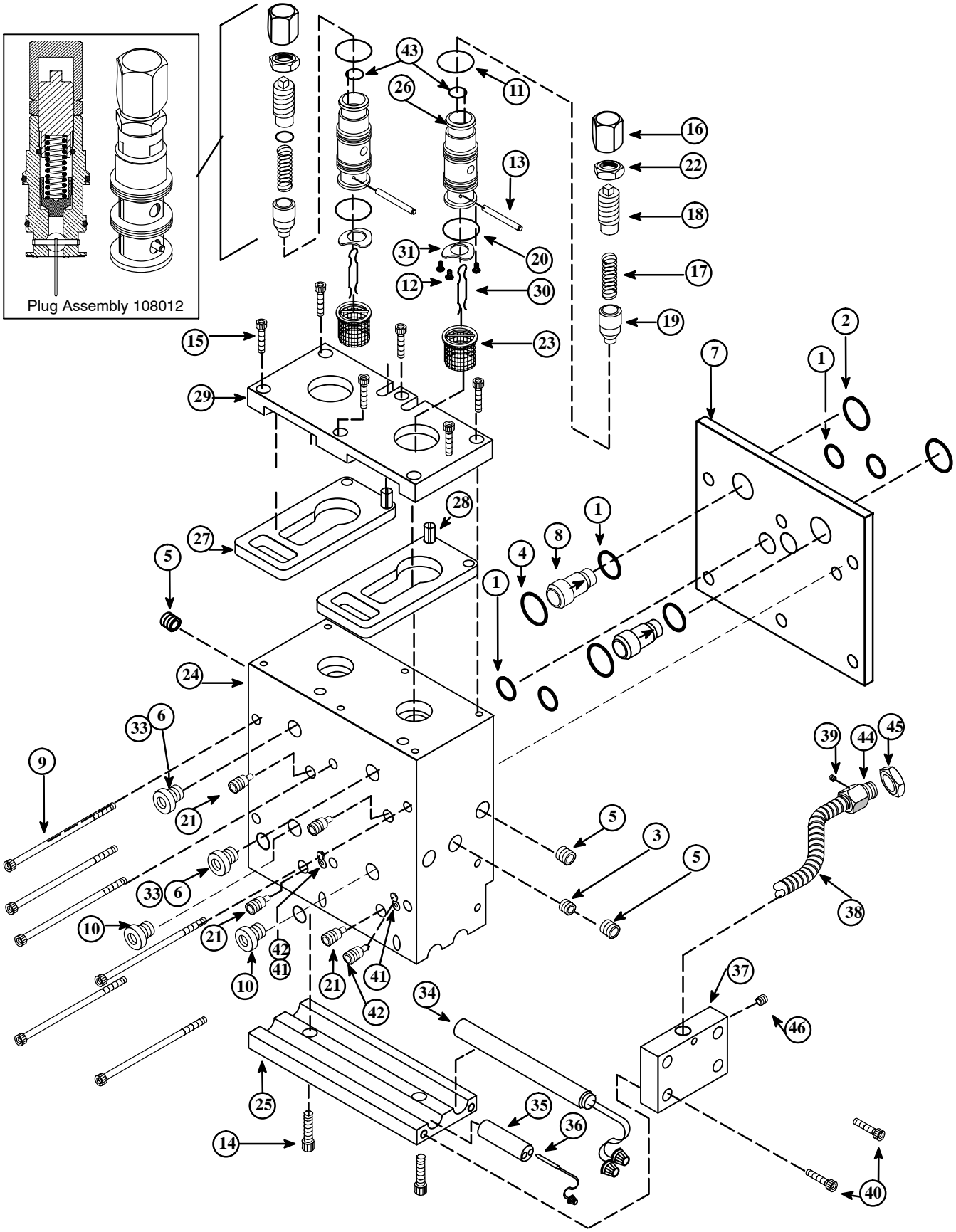
Chapter Format

This chapter contains the component illustrations (exploded-view drawings) for each assembly of the DYNAMELT M SERIES ASU. These drawings are useful for finding part numbers as well as for use when maintaining or repairing the unit.

Note: most common nuts, bolts and fasteners can be obtained locally at your hardware store. Specialty fasteners are available by contacting Dynatec's Customer Service.

Bill of Materials for Pressure Relief & High Temp. Filter Block Assembly #102710 (Items from Heater Control Groups: 103571, 103572, 103573, 103574 are also Included in this illustration and bill of material.)

Item No.	Part Number	Description	Qty.
	102710	**Filter Block Top Assembly**	**1**
1	N00181	O-ring, 014	6
2	N00185	O-ring, 018	2
3	N00753	1/8 NPT Level Seal Plug	1
4	N00187	O-ring, 020	2
5	N00754	1/4 NPT Level Seal Plug	3
6	103626	3/8 BSPP Plug	2
7	102712	Filter Block Insulator Plate	1
8	102717	Check Valve, .655 Cart, 1 way	2
9	NPN	M8-1.25 x 90 SHC Screw	6
10	803173	1/2 BSPP Plug (803984 #06, 804155 #08, 803142 #12 hose fitting)	2
	108928	**Manifold Sub Assembly**	**1**
11	112667*	O ring, 124	2
12	A78A282*	#0 x 1/8 Drive Screw	6
13	N02969*	Pin Spring .125 x 1	2
14	105099	M8 x 25 SHC Screw	2
15	N07429	M8-1.25 x 30mm	6
16	006G112*	Cap, Adjustment Screw	2
17	012E002*	Pressure Relief Spring	2
18	109244*	Pressure Relief Adjustment Screw	2
19	109245*	Bullet, Hi-Pressure	2
20	112666*	O-ring, 122	2
21	104733	Plug, Pressure Transducer, 1/2-20	4
22	078D027*	3/4-16 Jam Nut	2
23	101246	Filter Basket, 40 Mesh	2
24	102711	Filter Block	1
25	102713	Filter Block Heater Retainer Plate	1
26	102714*	Pressure Relief/ Filter Plug	2
27	102715	Filter Plug Retainer Slide	2
28	N04349	Pin, Spring, .250 x .875	2
29	102716	Slide Housing Frame	1
30	102718*	Filter Pull Clip	2
31	102719*	Filter Preload Wave Spring	2
32	103770	O-ring, 5-005	2
33	103771	O-ring, 5-254	2
	103571	**Heater Control Section 240v, 1 block**	
	103572	**Heater Control Section 240v, 2 block**	
	103573	**Heater Control Section 240v, 3 block**	
	103574	**Heater Control Section 240v, 4 block**	
34	036A170	Heater,5/8 x 5", 240v, 500w (used with 1 Filter Block Assembly)	1
	036A079	Heater, 5/8 x 10", 240v, 1000w (used with 2 Filter Block Assemblies)	1
	102149	Heater, 5/8 x 15", 240v, 1500w (used with 3 Filter Block Assemblies)	1
	036A077	Heater,5/8 x 20",240v,2000w (Used with 4 Filter Block Assemblies)	1
35	036E032	Sensor Adapter	1
36	036B103	Temperature Sensor	1
37	107754	Cover, Hi-Temp Sensor & Heater Section	1
38	107645	Conduit, 10"	1
39	106156	M4 x 6mm SHSS	1
40	104163	M6 x 25mm SHC Screw	2
41	101833	10-32 x 1/2 Tamper Proof screw	2
42	104852	M10 x 12 cone, Relief, Set Screw	2
43	N00199*	O-ring, 114	2
44	107751	Conduit Fitting (located in junction box)	1
45	N06883	Jam Nut (located in junction box)	1
46	103570	M5 x 8 x 6, CUD SH Set Screw	1
	Note:	****These items are included in 108012 Plug Assembly***	

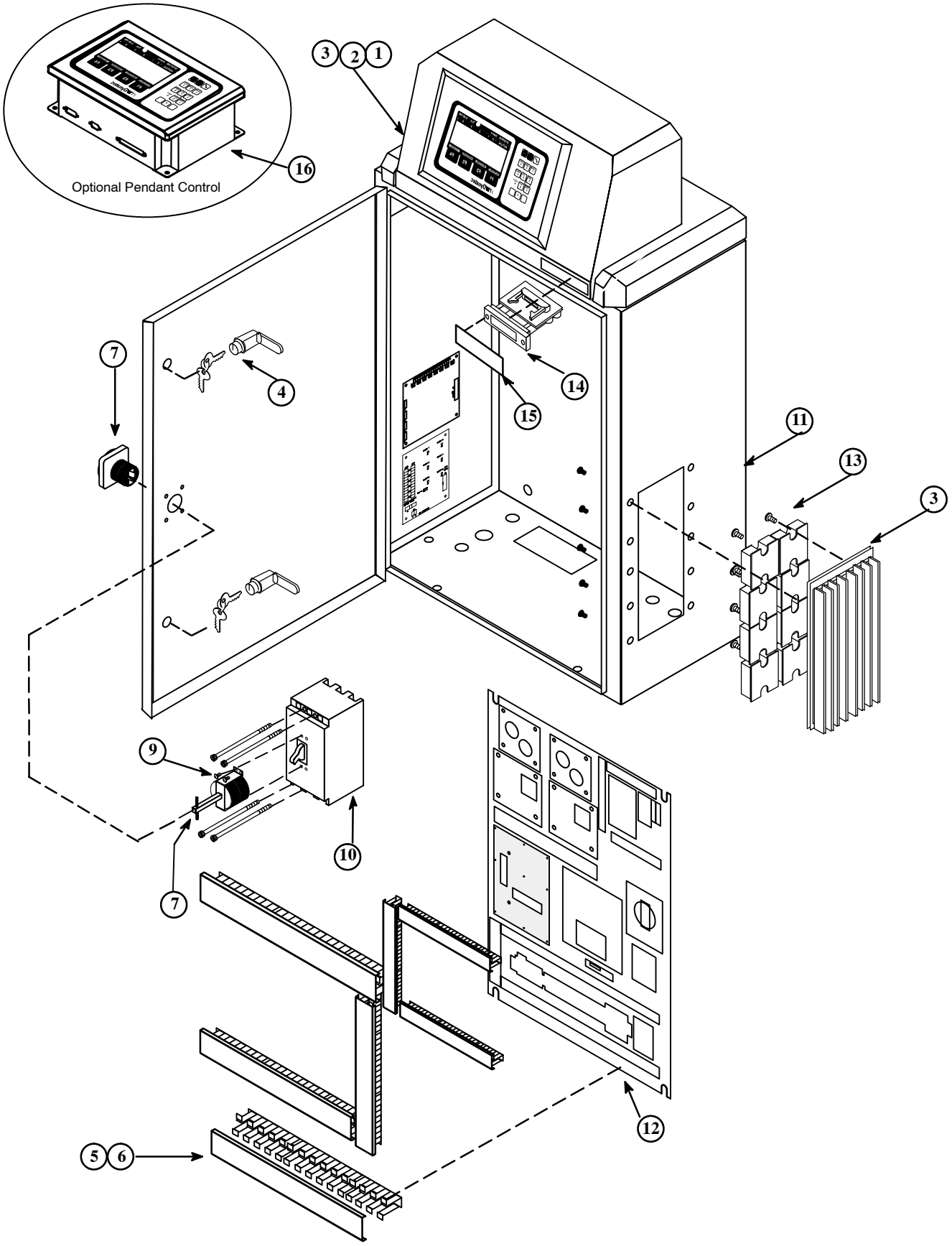


Component Illustration: Filter & Pressure Relief Assembly # 102710

Bill of Materials for Typical Electrical Panel Box Assembly 107715

Item No.	*Part Number*	*Description*	*Qty.*
1	802102	Mounting Bracket	1
2	107625	Bezel	1
3	802626	Heat Sink	2
4	102328	Panel Box Lock Kit	2
5	103377	Wire duct, 1.5" W x 3" H	3
	103378	Wire duct, 2" w x 3"H	3
6	103439	Wire Duct Cover, 1.5."	3
	103438	Wire Duct Cover, 2.25"	3
7	104387	Rotary Handle & Shaft	1
8	107891	Bracket, Circuit Breaker	1
9	104387	Mechanical, Operator, Circuit Breaker	1
10	104761	Circuit Breaker	1
11	802850	Panel Box	1
12	107890	Insert Panel	1
13	048H384	SSR Dual 40A, 240VAC	3-8
14	107993	Memory Card Assembly (option)	1
15	102326	Cover, Memory Card	1
16	109770	Pendant Control Assembly (option	1

Continued on pages 6 thru 7.


Optional Pendant Control
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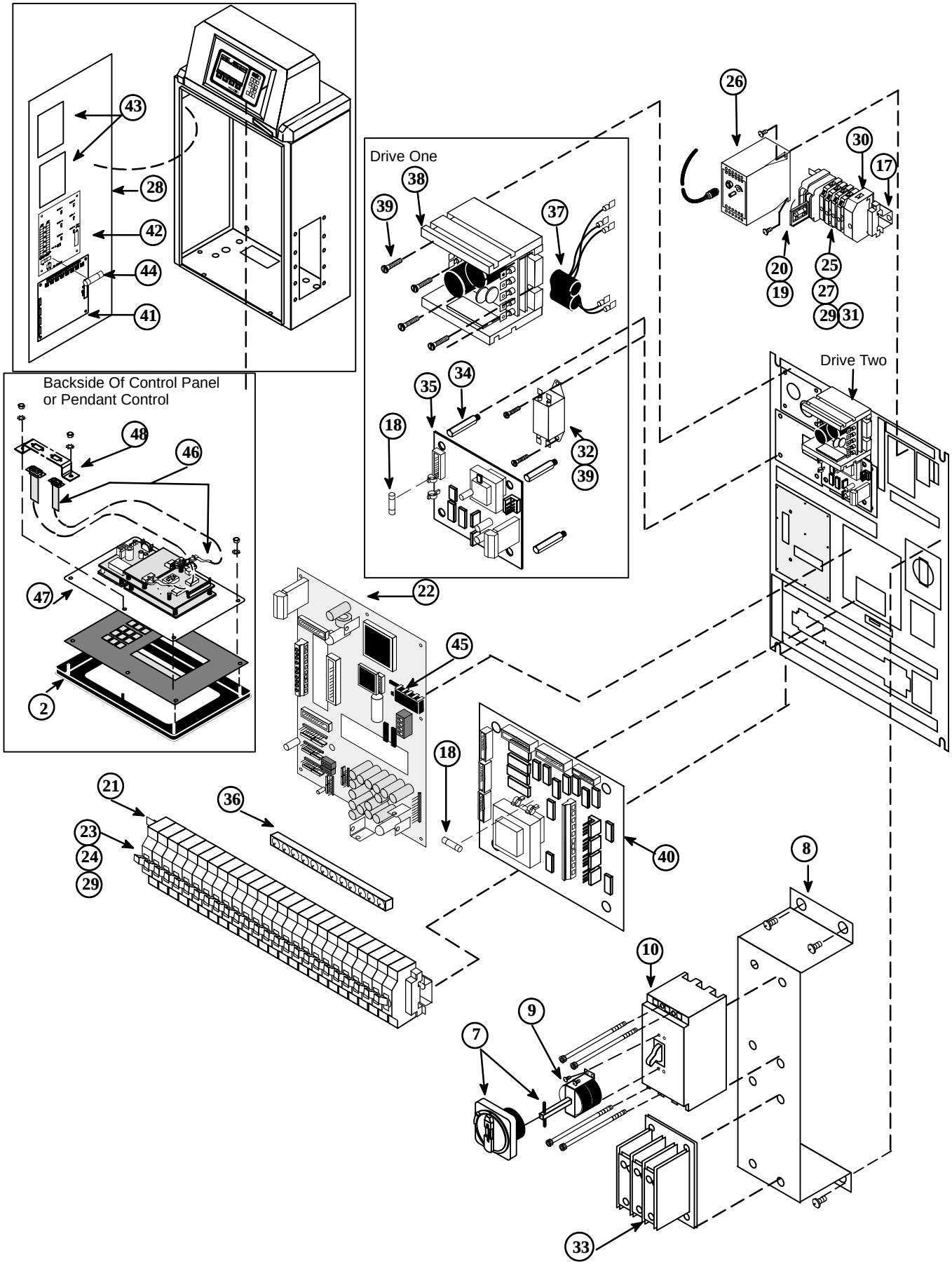
Bill of Materials for Typical Electrical Panel Box Assembly 107715 (Cont. from pg. 4)

Item No.	Part Number	Description	Qty.
17		Terminal Rail	1
18	102762	1 Amp Fuse	4
19	103183	Fuse Block, Lever Open	4
20	103184	Fuse, GDC4, 250VAC	3
21		Terminal Rail	**1**
22	109857	Control Processor Board (CPU)	1
23	103069	Circuit Breaker, CB,16A,63F,415V,1P,SPCL	22
24	103070	Circuit Breaker, CB,20A,63F,415V,1P,SPCL	2
25	104193	Ground, Small Dual	1
26	10062	Level Control	4
27	105252	End Plate for105251	1
28	107892	Side Panel Insert	1
29	105254	End Plate for105253	6
30	103663	Ground BUS	1
31	105256	End Stop	4
32	106978	Filter, RFI (EMI)	1
33	048H383	Contactor, 90A, 3Pole, 480V, 230VCOIL	1
34	048E162	Stand-off	4-8
35	110090	Motor Control Interface	1
36	804713	Ground Block	1
37	107033	Motor Choke, RFI/EMI, 30 AC	1-2
38	106395	Motor Speed Control	1-2
39	106111	M4 x 0.7 x 12 Button head	6-12
40	107440	Power Board	1
41	106147	Pressure Board	1
42	107438	Clutch Board	1
43		KBSI Board	1–2
44	107466	2 Amp Fuse	1
45	107893	Eprom Chip	1
46	107922	Ribbon Cable Assm., 15PinM, 9 PinF Serial, 8 conductor crimp-on	1
47	108256	Control Assembly	1
48	107891	Cable Assembly Bracket	1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Drive One
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Drive Two
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Backside Of Control Panel
or Pendant Control
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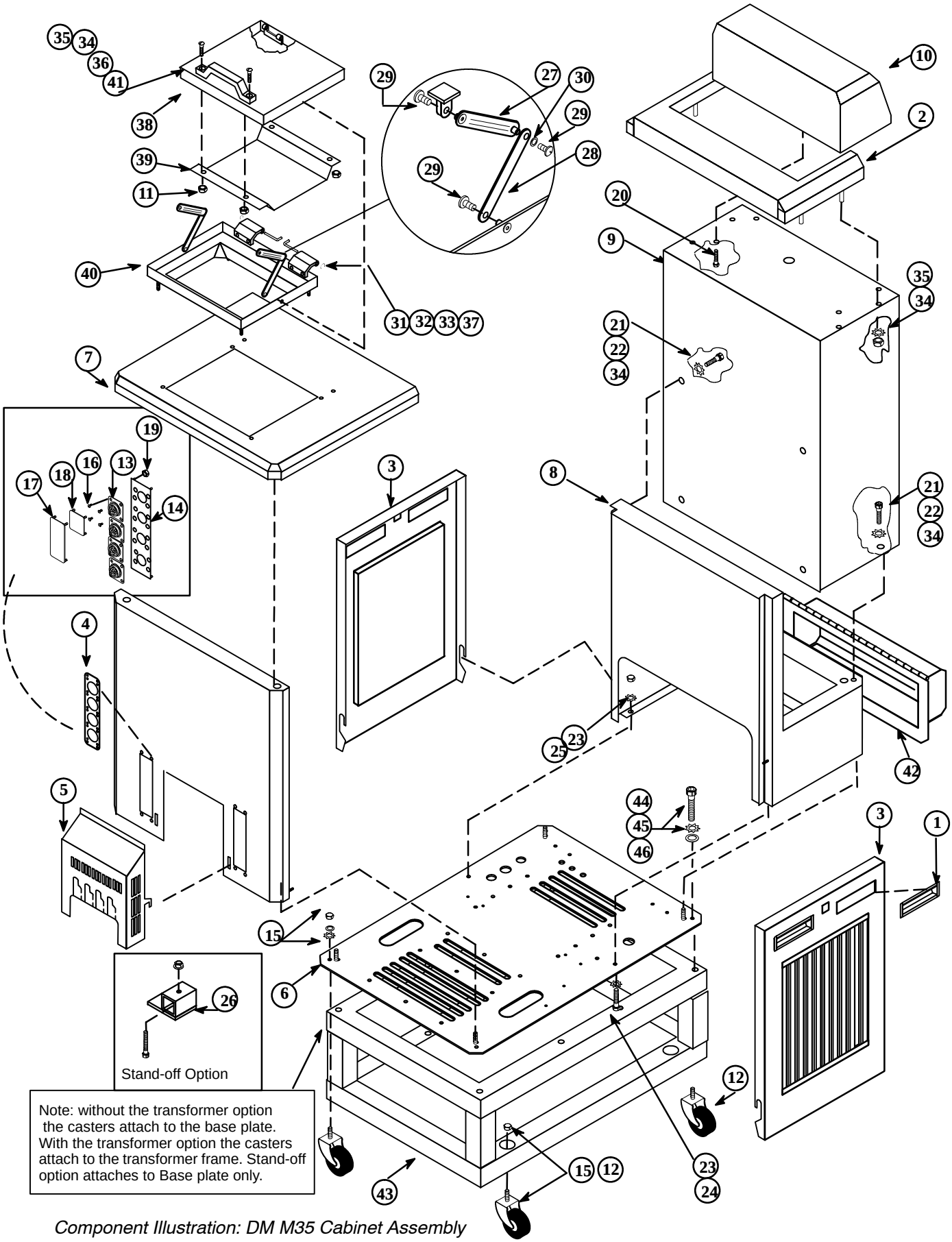
Bill of Materials for DYNAMELT M35 Series Cabinet Assembly

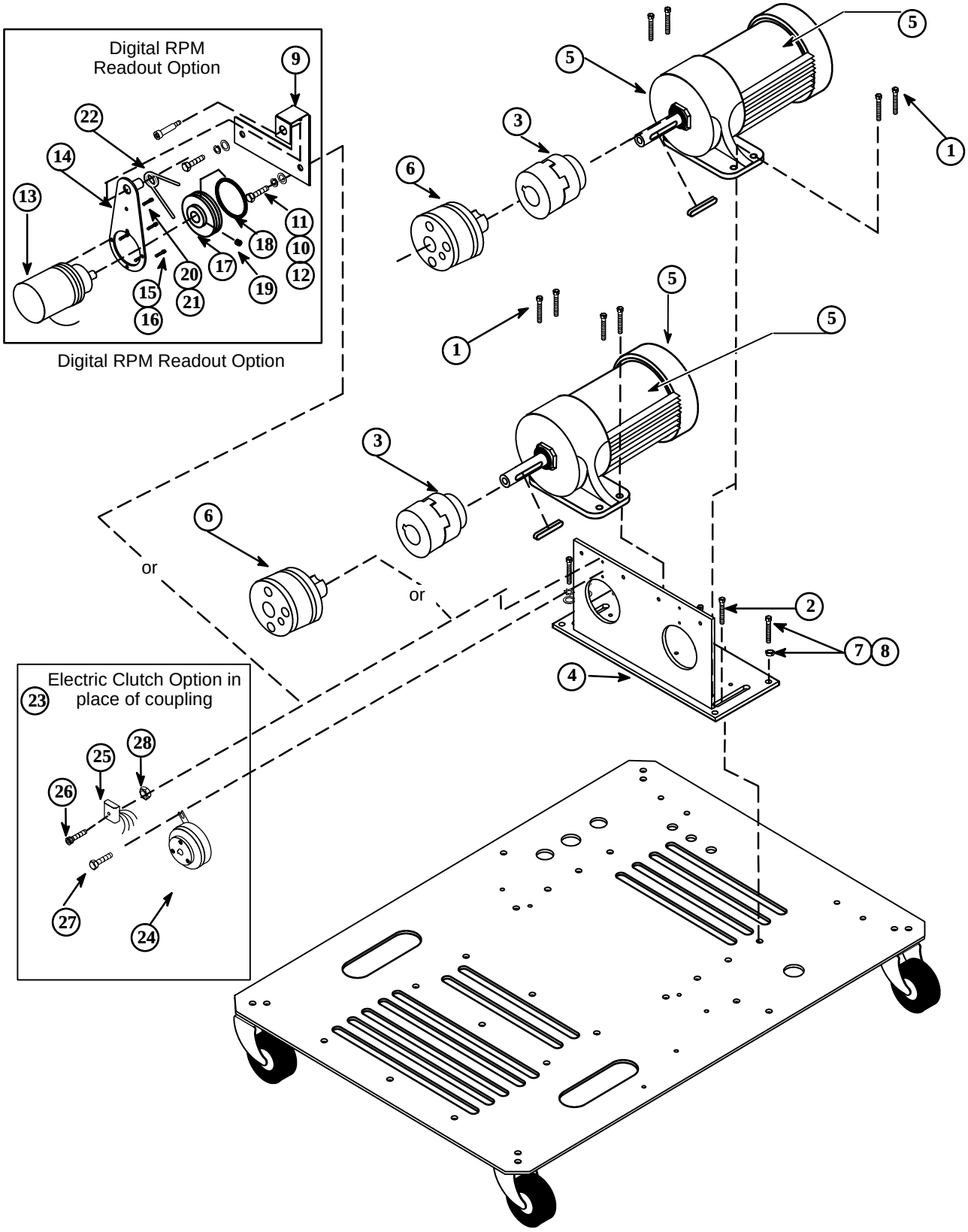
Item No.	Part Number	Description	Qty.
1	101843	Handle, Side Panel	4
2	105880	Panel, Top, Bracket	1
3	106186	Access Cover	2
4	106184	Rear Cover M35	1
5	107890	Manifold Cover	1
	108128	Manifold Cover , Hi Flow Only	
6	106187	Base Plate M70/140	1
7	105882	Top Panel M70/140	1
8	106183	Heat Barrier, Panel Box, M70	1
9	802805	Panel Box	1
10	802102	DCL Mounting Bracket	1
11	106110	M5 Hex Nut	4
12	103115	Swivel Caster	4
13	101074	Receptacle	4 or 8
14	103866	Bracket, Connector Bank, Amphenol	1 or 2
15	107393	3/8-16 Kep nuts	4
16	106111	M4 x 12 BHC Screw	16 or 32
17	101304	Blank Plate, Dual	0, 1 or 3
18	104279	Blank Plate, Single	0 or 4
19	105111	M3 Hex Nut	0, 4 or 8
20	106066	M5 x 16mm HHC Screw	4
21	104662	M6 x 16mm SHC Screw	6
22	106324	M6 Flat Washer	6
23	106237	M8 Star Washer	8
24	106112	M8 x 12mm HHC screw	4
25	105060	M8 Hex Nut	4
26	109585	Stand-off Option	4
	106048	**Lid Assembly**	1
27	106772	Inner Hinge	2
28	106773	Outer Hinge	2
29	105152	M3 x 6mm PHLC Screw	6
30	106892	M3 Flat washer	6
31	105117	M4 x 8 Pan Head Screw	4
32	106236	M4 Star Washer	4
33	106876	Retaining Clip	2
34	106319	M6 Star Washer	4
35	105865	M6 Hex Nut	4
36	105101	M6 x 16mm HHC Screw	2
37		Hinge (Attached to hopper lid)	2
38	106769	Lid Hopper	1
39	106770	Heat Deflector, M35/70	1
40	106771	Collar, Hopper, M35/70	1
41	101842	Handle, Hopper, Lid	1
42	804749	Front Panel Kit (Option)	1
	805042	**Transformer Option**	
43	804532	Base Plate Transformer Extention	1
44	N02145	3/8-16 x 1.25 SHC Screw (Transformer extention hardware)	4
45	078C013	3/8 Flat washer (Transformer extention hardware)	4
46	078C017	3/8 Lock Washer (Transformer extention hardware)	4
	804526	Transformer (not Shown)	1
	N01829	3/8-16 x 3 HHC Screw (transformer hardware not shown)	4
	078D008	3/8-16 Hex Nut (transformer hardware not shown)	4


Stand-off Option
Note: without the transformer option the casters attach to the base plate. With the transformer option the casters attach to the transformer frame. Stand-off option attaches to Base plate only.

Component Illustration: DM M35 Cabinet Assembly

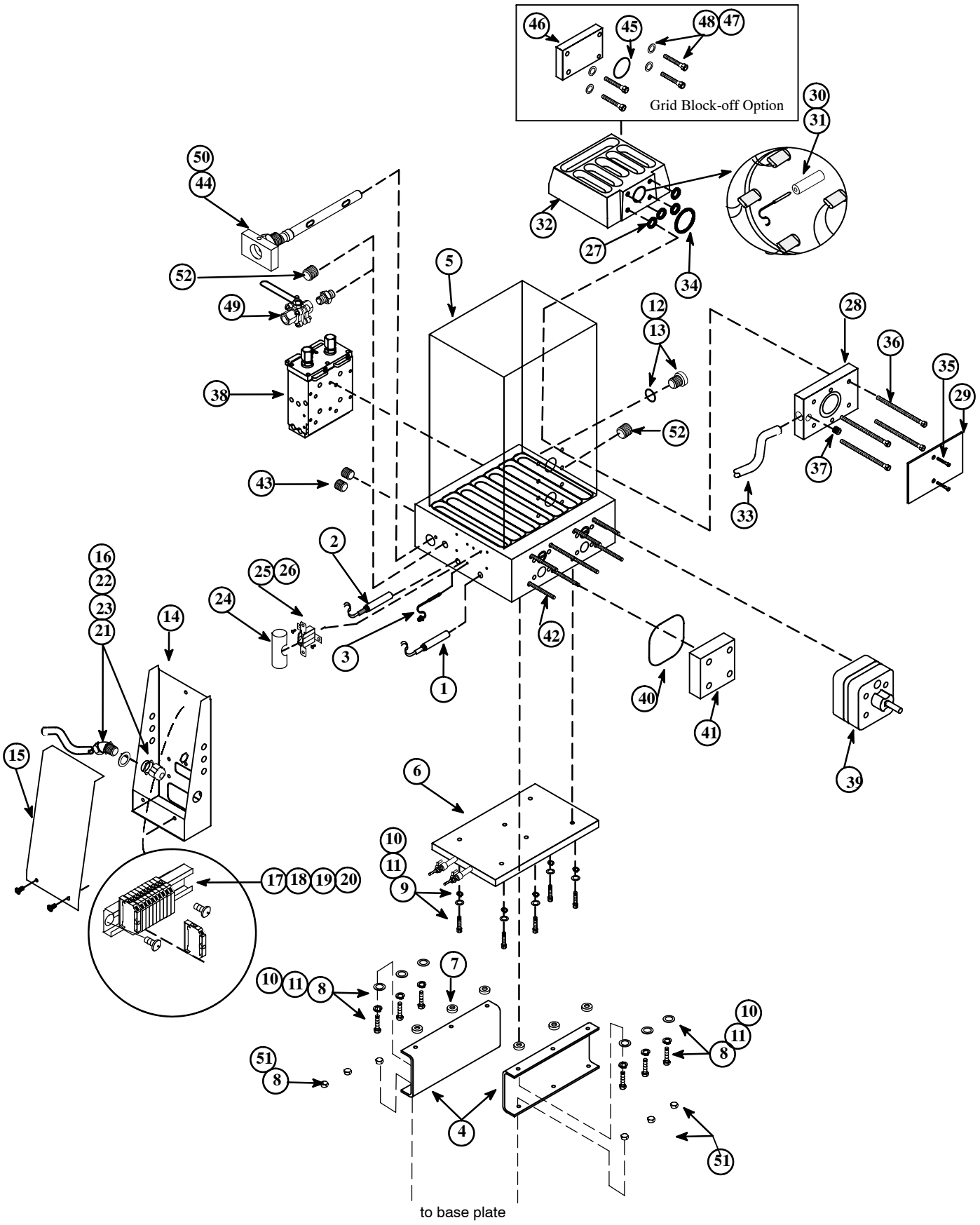
Bill of Materials for AC Dual Drive 107943 & AC Single Drive Assembly PN 107942

Item No.	Part Number	Description	Qty.	Dual Qty.
1	101156	M6-1,0 x 20mm SHC Screw	4	8
2	107602	M8 x 1,25 x 40mm	4	4
3	102172	Coupling, Jaw, .50/.75 Sahft	1	2
4	107941	Motor Bracket	1	1
5	106389	Motor, 1/4 HP, 20:1, AC	1	2
6		Pump (See Your Order For Part Number)	1	2
7	103518	M10 x 30mm SHC Screw	4	8
8	107401	M10 Nut	4	8
9	**107946**	**Digital RPM Readout Kit (Option)**		
10	104648	Encoder bracket	1	
11	105101	M6–1.0 x 16mm HHC	2	
12	N00688	1/4 Flat Washer	3	
13	N00697	1/4 Spring Lock Washer	2	
14	107077	Encoder Assembly, DM SBC	1	
15	104647	Encoder Mount Arm	1	
16	N00853	4-40 x .375 Fil Head Screw	4	
17	N00692	#04 Spring Lock Washer	4	
18	104649	Encoder Drive Wheel	1	
19	N06006	O-ring, -224	1	
20	103470	M3-0.5 x 5mm Flat Point Set Screw	1	
21	106111	M4-0.7 x 12mm Button Head Screw	1	
22	103121	M4-0.7 Hex Nut	2	
	104651	Torsion Spring, .56 OD x .063d	1	
23	**107945**	**Electric Clutch Kit** (Option used in place of Coupling)	**1**	
24	103435	Clutch	1	
25	103436	Power Supply	1	
26	106071	M4 x 25 mm SHC Screw	2	
27	103121	M4 x 0.7 Nut	1	
28	105865	M6 x 1.0 Nut	1	
	N00053	Terminal Butt, 16-14 GA, Insulation (Not Shown)	2	
	N06946	Terminal Spade, 22-18 GA, #6, Insulation (Not Shown)	2	


Digital RPM
Readout Option
9
22
14
13
11
18
10
12
20
17
19
15
21
16
Digital RPM Readout Option
5
5
1
3
6
5
5
1
3
6
or
or
2
7
8
4
Electric Clutch Option in
place of coupling
23
25
28
26
27
24

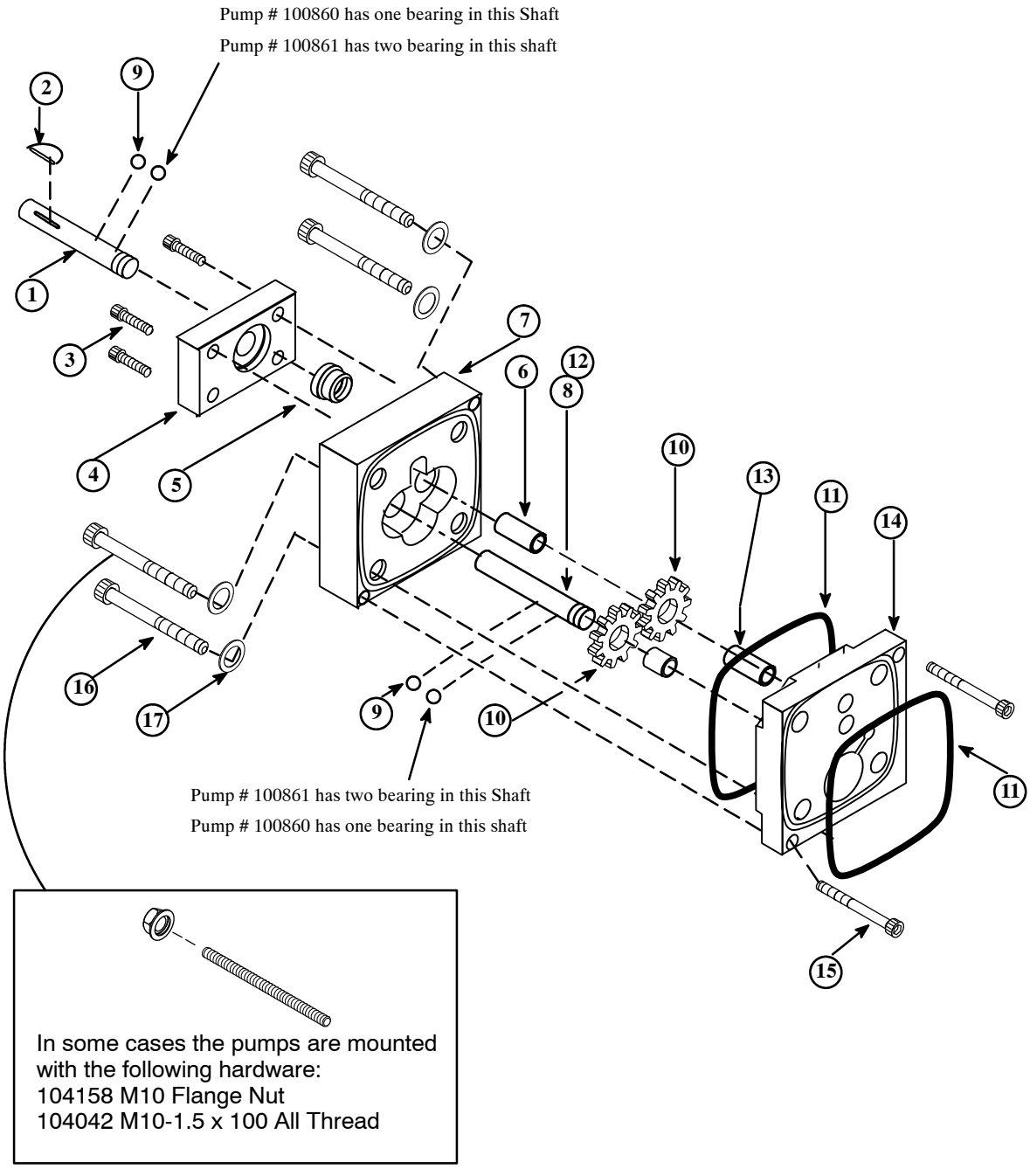
Bill of Materials for DYNAMELT M35 Melt & Grid Assemblies.

Item No.	Part Number	Description	Qty.
1	036B015	Pump Enable Thermostat, N.O. 1/2 Dia.	1
2	036B013	Pump Enable Thermostat, N.C. 1/2 Dia.	1
3	N07958	Temperature Sensor	1
4	106189	Hopper Support	2
5	105883	Hopper, Assy.	1
6	105881	Heater Plate	1
7	L00006	Spacer	6
8	108298	M8 x 30mm HHC Screw	12
9	N07370	M6 x 30 SHC Screw	6
10	N00686	Flat Washers, 1/4	18
11	N00697	Lock Washer, 1/4	18
12	103749	Filter Shut-off Plug (used in place of or opposite Filter Shut-off)	1
13	N00210	O-ring, -912	1
	108827	**Junction Box Assembly**	**1**
14	105885	Junction Box, Prog-Melt, M70/ 140	1
15	106001	Cover, Junction Box,	
16	048J018	Bushing, Plastic Cap, 1/2"	2
17	107441	Terminal Rail, 11.5"	1
18	107604	Block, Terminal	22
19	N05889	Terminal	3
20	107389	M4 x8	2
21	048J015	1/2 Sealtite Connector	1
22	048J018	Plastic Bushing	1
23	108828	Conduit,1/2"Sealtite,20"	1
	104166	**Over Temp. Switch Assembly (Sold as an assembly only)**	1
24	104165	Insulator, Over Temp Thermostat	1
25	104164	Overtemp Reset Thermostat	1
26	103538	M4 X 6mm Pan Head	1
		Grid Group	**1**
27	N00181	O-ring, -014	4
28	104696	Flange	1
29	003E023	Cover	1
30	036B103	Temperature Sensor	1
31	106174	Sensor Adapter	1
32	104802	Cast Heater	1
33	107645	5/16 ID Conduit	1'
34	N00192	O-ring	1
35	102446	M4-0. 70 x 10mm SHC Screw	2
36	N07416	M8 x 35mm SHC Screw	4
37	078A055	10-24 x 3/16 SHS Screw	1
38		**Filter Block (see your order for part number)**	
39		**Pump (see your order for part number)**	**1-2**
	084Q465	**Pump Block Off Assembly**	**1**
40	069X064	O-ring, #-041	1
41	012G009	Block-off Plate	1
42	104072	M10 x 100 Stud	4
43	N00754	Level Seal Plug	2
44	**105968**	**Filter Shutoff Assembly, Alim, TFE**	**1**
	805216	**Grid Block Off Assembly (Option)**	1
45	105149	Block off Plate	1
46	N00192	O-ring, #-032	1
47	108297	M8 x 20mm HHC Flange Screw	4
48	N00181	O-ring, #014	4
49	**106103**	**Ball Valve Assembly (Option)**	1
50	105097	M6 x 30mm SHSet Screw	1
51	107392	M8 Nut With Washer	6
52	072X093	1/2 NPT Level Seal Plug	2


Grid Block-off Option
to base plate

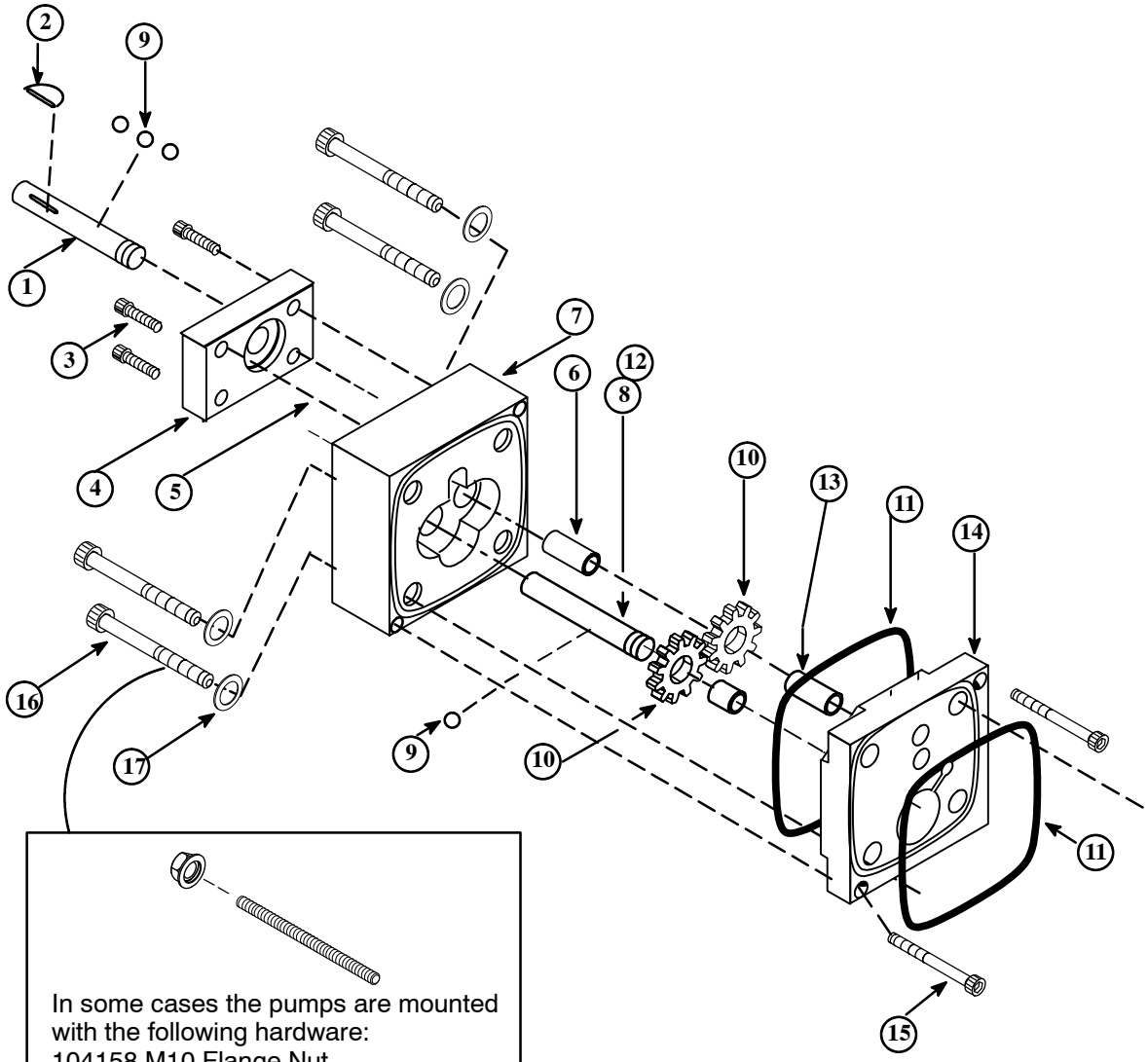
Bill of Materials for 1.54 cc / Rev. , Single Gear Pump Assembly # 100860
Bill of Materials for 3.2 cc / Rev. , Single Gear Pump Assembly # 100861

Item No.	Part Number #100860 / #100861	Description	Qty.
1	012D079 / 012D077	Drive Shaft	1
2	078I001	Key, Woodruff	1
3	101626	M5 x 12 SHC Screw	4
4	069X160	Seal Retainer & Bearing Housing	1
5	069X061	Lip Seal	1
6	018X041	Bearing Sleeve	2
7	100866 / 100867	Front Plate Assembly	1
8	012D080 / 012D078	Driven Gear Shaft	1
9	018X031	Ball, 1/8" Diameter (See illustration for quantity)	2-4
10	012C020 / 012C019	Drive Gear, 1.54 cc/rev	2
11	069X064	Pump Seal	2
12	078F017	Shaft Retaining Ring	4
13	018X041	Bearing Sleeve, Rear Plate	2
14	100865	Rear Plate Assembly	1
15	100908	M4 x 25 SHC Screw	2
16	104775/ 104776	M10-1.5 x 75mm/ 80mm	4
17	NPN	M10 Flat Washer	4


Pump # 100860 has one bearing in this Shaft
Pump # 100861 has two bearing in this shaft
Pump # 100861 has two bearing in this Shaft
Pump # 100860 has one bearing in this shaft
In some cases the pumps are mounted with the following hardware:
104158 M10 Flange Nut
104042 M10-1.5 x 100 All Thread

Bill of Materials for 4.50 cc / Rev. , Single Gear Pump Assembly # 100862

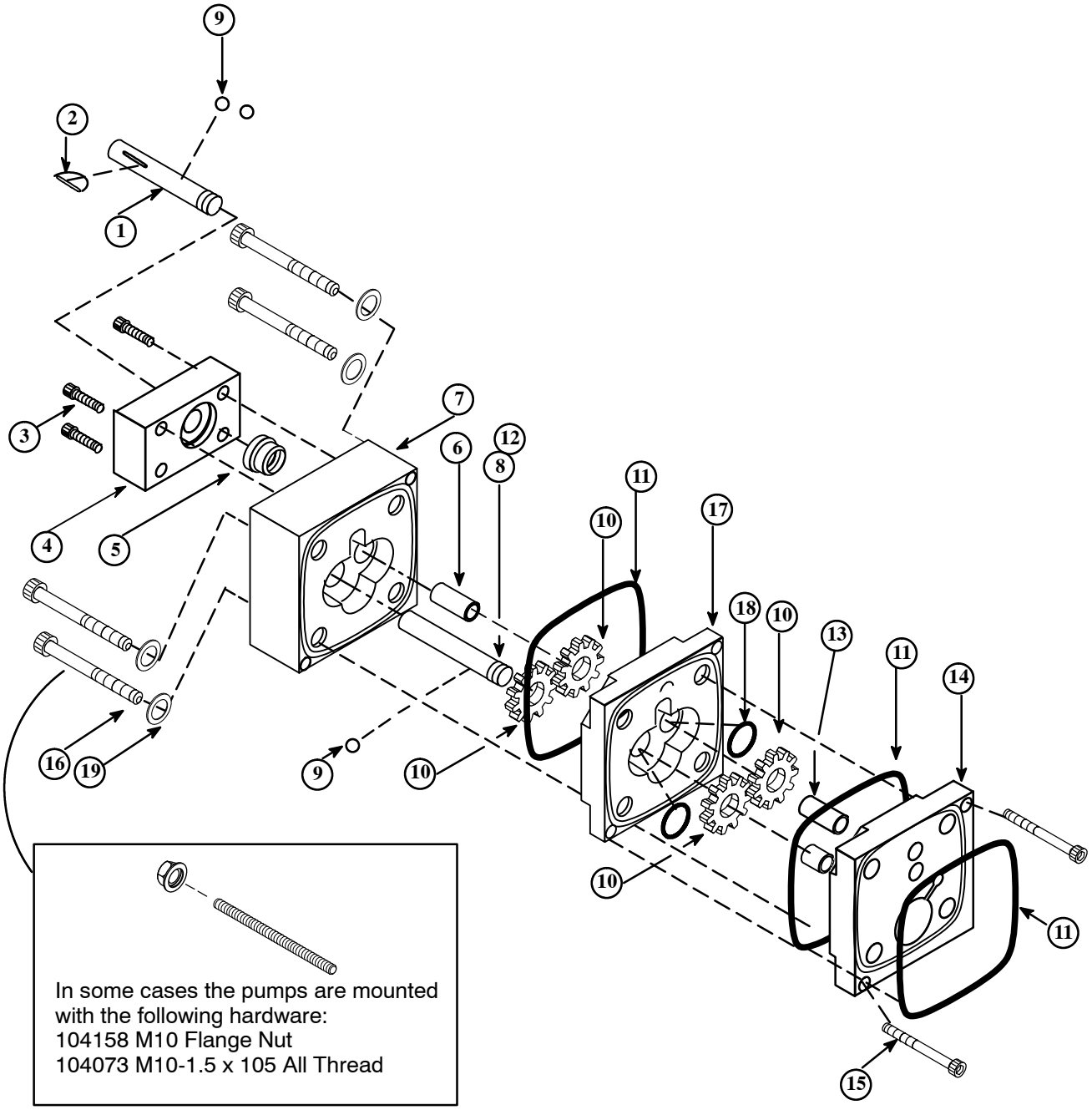
Item No.	Part Number	Description	Qty.
1	012D072	Drive Shaft	1
2	078I001	Key, Woodruff	1
3	101626	M5 x 12 SHC Screw	4
4	069X160	Seal Retainer & Bearing Housing	1
5	069X061	Lip Seal	1
6	018X041	Bearing Sleeve	2
7	100868	Front Plate Assembly	1
8	012D073	Driven Gear Shaft	1
9	018X031	Ball, 1/8" Diameter	4
10	012C018	Drive Gear, 4.5 cc/rev	2
11	069X064	Pump Seal	2
12	078F017	Shaft Retaining Ring	4
13	018X041	Bearing Sleeve, Rear Plate	2
14	100865	Rear Plate Assembly	1
15	100908	M4 x 25 SHC Screw	2
16	104776	M10-1.5 x 80mm	4
17	NPN	M10 Flat washer	4



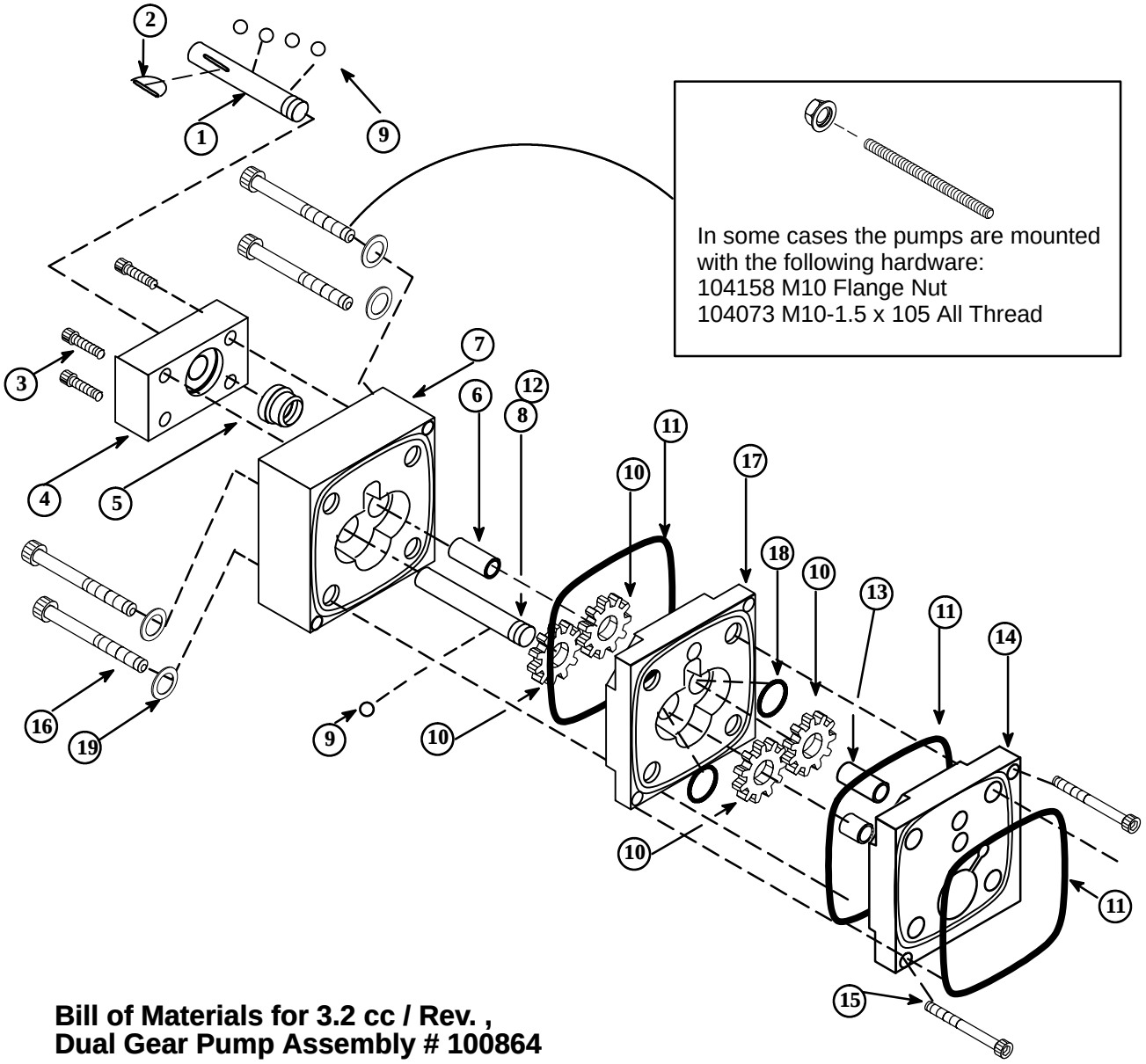
In some cases the pumps are mounted with the following hardware:
104158 M10 Flange Nut
104042 M10-1.5 x 100 All Thread

Bill of Materials for 1.54 cc / Rev. , Dual Gear Pump Assembly # 100863

Item No.	Part Number	Description	Qty.
1	012D083	Drive Shaft	1
2	078I001	Key, Woodruff	1
3	101626	M5 x 12 SHCS	4
4	069X160	Seal retainer & Bearing Housing	1
5	069X061	Lip Seal	1
6	018X041	Bearing Sleeve	2
7	100866	Front Plate Assembly	1
8	012D082	Driven Gear Shaft	1
9	018X031	Ball, 1/8" Dia.	3
10	012C020	Pump Gear, 1.5 cc/Rev	4
11	069X064	O-ring, -041	3
12	078F017	Shaft Retaining Ring	4
13	018X041	Bearing Sleeve, rear Plate	2
14	100865	Rear Plate Assembly	1
15	101692	M4 x 35 SHCS	2
16	NPN	M10-1.5 x 85mm SHC Screw	4
17	100869	Middle Plate	1
18	N00198	O-ring, -113	2
19	NPN	M10 Flat Washer	4

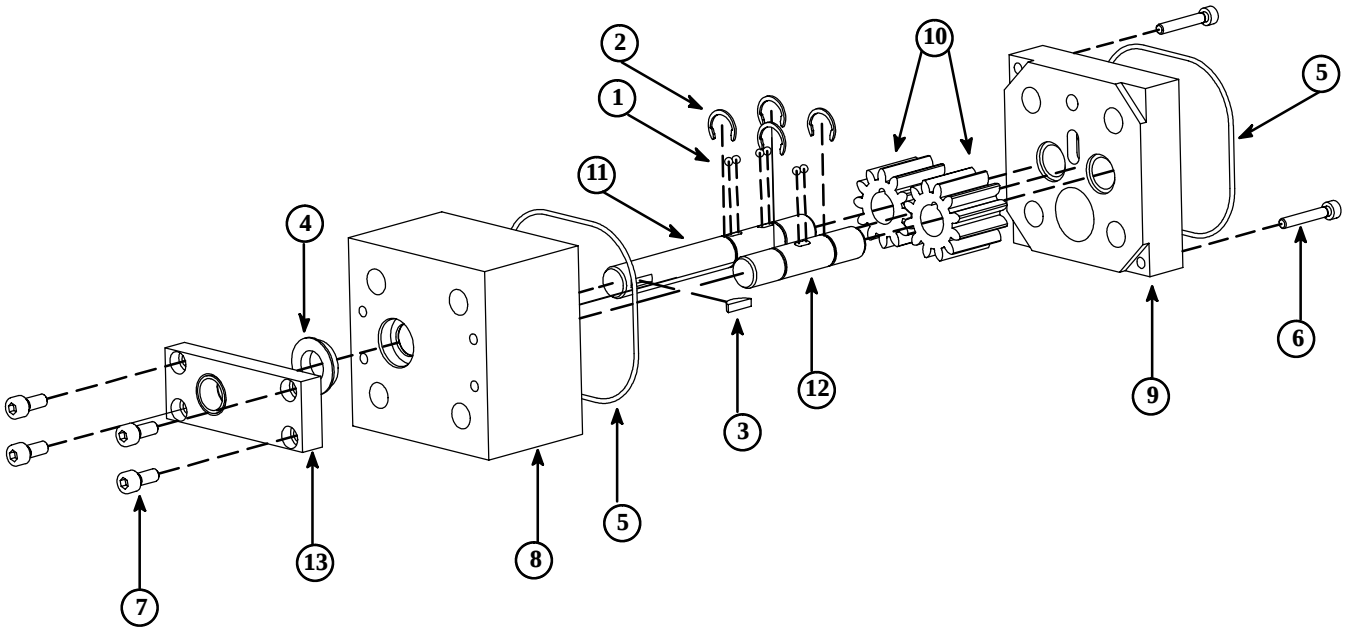


Component Illustration: 1.54 cc / Rev, Dual Gear Pump Assembly #100863



Bill of Materials for 3.2 cc / Rev. , Dual Gear Pump Assembly # 100864

Item No.	Part Number	Description	Qty.
1	012D088	Drive Shaft	1
2	078I001	Key, Woodruff	1
3	101626	M5 x 12 SHCS	4
4	069X160	Seal retainer & Bearing Housing	1
5	069X061	Lip Seal	1
6	018X041	Bearing Sleeve	2
7	100867	Front Plate Assembly	1
8	012D087	Driven Gear Shaft	1
9	018X031	Ball, 1/8" Dia.	5
10	012C019	Drive Gear, 4.5 cc/Rev	4
11	069X064	O-ring, -041	3
12	078F017	Shaft Retaining Ring	4
13	018X041	Bearing Sleeve, rear Plate	2
14	100865	Rear Plate Assembly	1
15	101691	M4 x 40 SHCS	2
16	NPN	M10-1.5 x 85mm	4
17	100870	Middle Plate	1
18	N00198	O-ring, -113	2
19	NPN	M10 Flat Washer	4



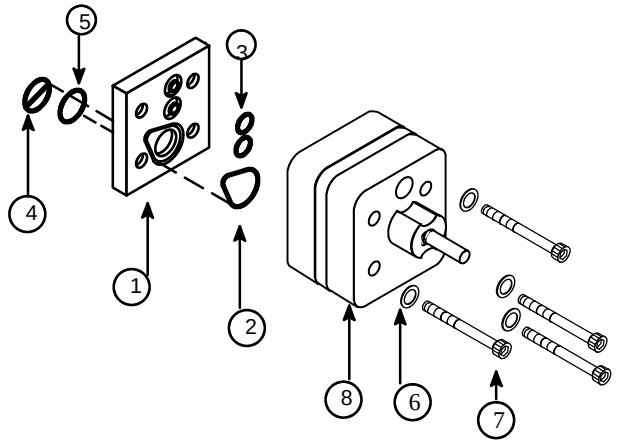
Bill of Materials for 10cc Single Gear Pump Assembly # 109690

Item No.	*Part Number*	*Description*	*Qty.*
1	018X031	Ball bearing, 1/8 Dia.	6
2	078F017	Snap ring, 1/2"	4
3	078I001	Key Woodruf, #404	1
4	069X061	Shaft Seal	1
5	069X064	O-ring, -041	2
6	100908	M4-0.7 x 25mm SHC Screw	2
7	101626	M5-0.8 x 12mm SHC Screw	4
8	109685	Pump Body10cc Rev	1
9	109686	Rear Bearing Plate 10cc Rev.	1
10	109689	Gear 10cc Rev	2
11	109687	Drive Shaft 10cc/ 20cc	1
12	109688	Driven shaft, 10cc/20cc	1
13	069X160	Shaft seal retainer	1
14	001U002	Dow Corning 112 Lubricant (Not Shown)	

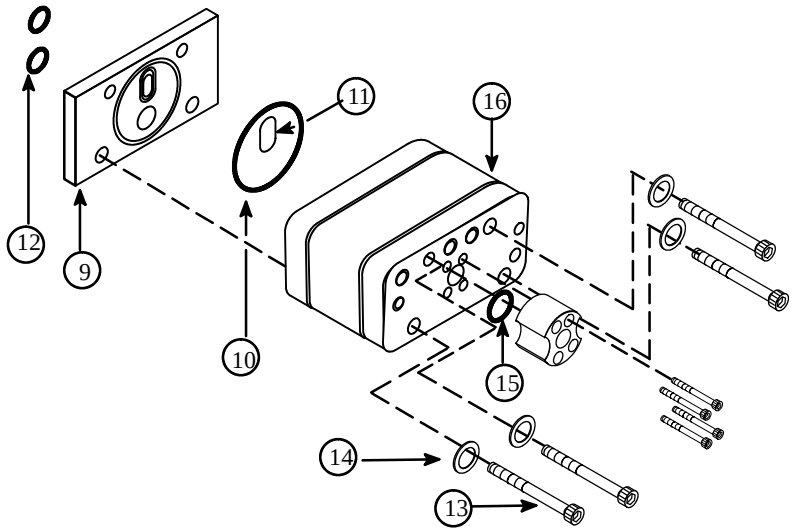
Bill of Materials for Assorted Pump Adapter Assemblies

Item No.	Part Number	Description	Qty.
	084E406	**TSHA Pump Adapter Assembly**	**1**
1	012G024	Pump Adapter	1
2	069X058	O-Ring #28	1
3	N00179	O-Ring #12	2
4	069X274	Seal Dual Pump to Progmelt (not part of this assembly)	1
5	N00190	O-Ring #24	1
6	078C130	3/8 Washer, 3/4 OD	4
7	NPN	M10 x 85mm SHC screw	4
8		Zenith Pump (Shown For REf. Only)	
	084E428	THSA .297 cc Single Outlet	
	084E374	THSA .584 cc Single Outlet	
	084E430	THSA 1.168 cc Single Outlet	
	084E434	THSA 2.292 cc Single Outlet	
	108875	THSA 8.5 cc Single Outlet	
	084E438	THSA 30.0 cc Single Outlet	
	084E389	THSA .584 cc Dual Outlet	
	084E432	THSA 1.168 cc Dual Outlet	
	108874	THSA 2.292 cc Dual Outlet	
	084E419	**Zenith Pump Adapter Assembly**	**1**
9	012G027	Adapter, Z Pump	1
10	069X064	O-Ring, #041	1
11	N01010	O-Ring, #021	1
12	069X270	O-Ring, #025	2
13	078A618	Screw, Pump Mounting	4
14	078C141	7/16 ss Washer, 3/4 OD	4
15	069X289	Drive Shaft Seal (shown For REf Only)	1
16		THSA Pump (Shown for ref. only)	
	110289	THSA 20 cc Single Outlet	
	110290	THSA 30 cc Single Outlet	
	110291	THSA 45 cc Single Outlet	
	103923	**Feinpruef Pump Adapter Assembly**	**1**
17	103624	Adapter Plate	1
18	103924	O-ring Plate	1
19	N00181	O-ring, -014	4
20	069X270	O-ring-025	1
21	102927	O-ring, -133	1
22		Feinpruef Pump	
	103917	Feinpruef Pump .3 cc	
	103918	Feinpruef Pump 1.2 cc	
	103919	Feinpruef Pump 2.4 cc	
	104351	Coupling Half (Not Shown, See drive Section)	

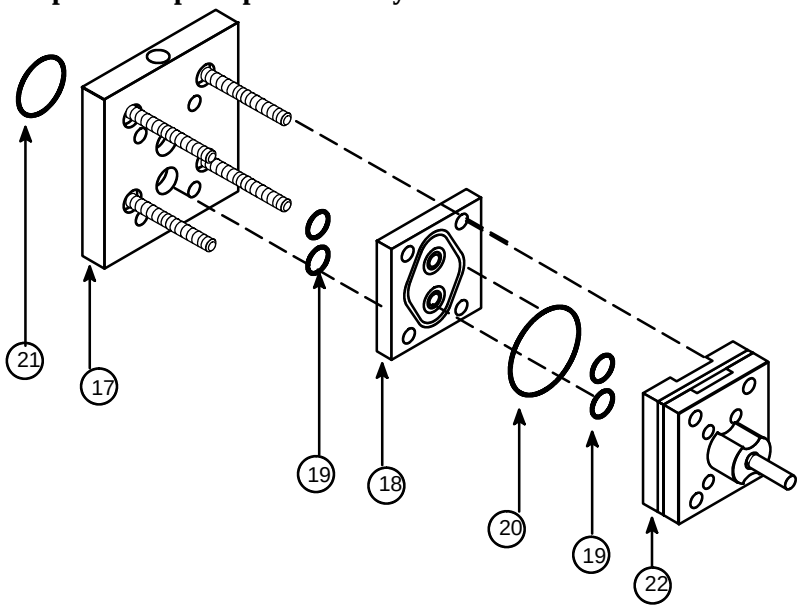
THSA Pump Adapter Assembly 084E406

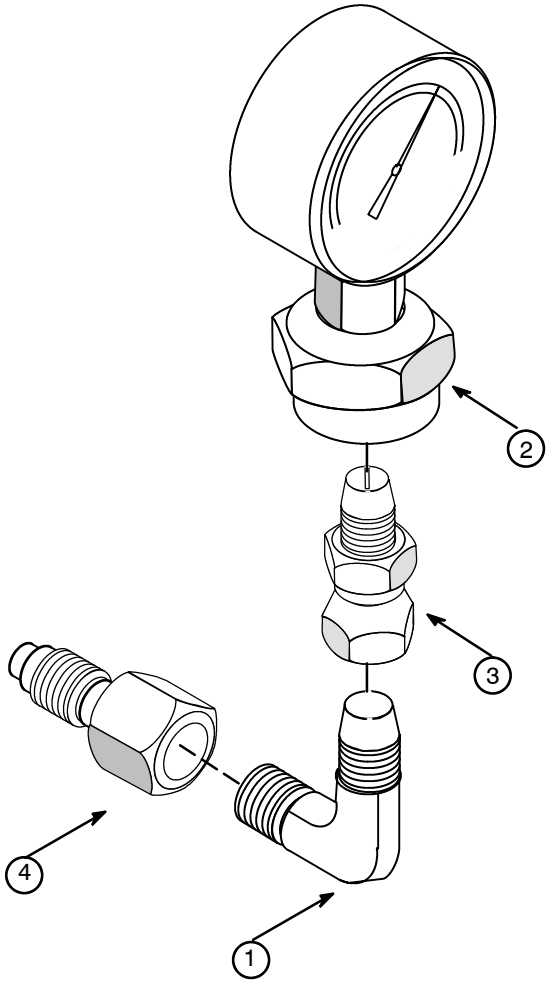


THSA Pump Adapter Assembly 084E419



Feinpruef Pump Adapter Assembly 103923



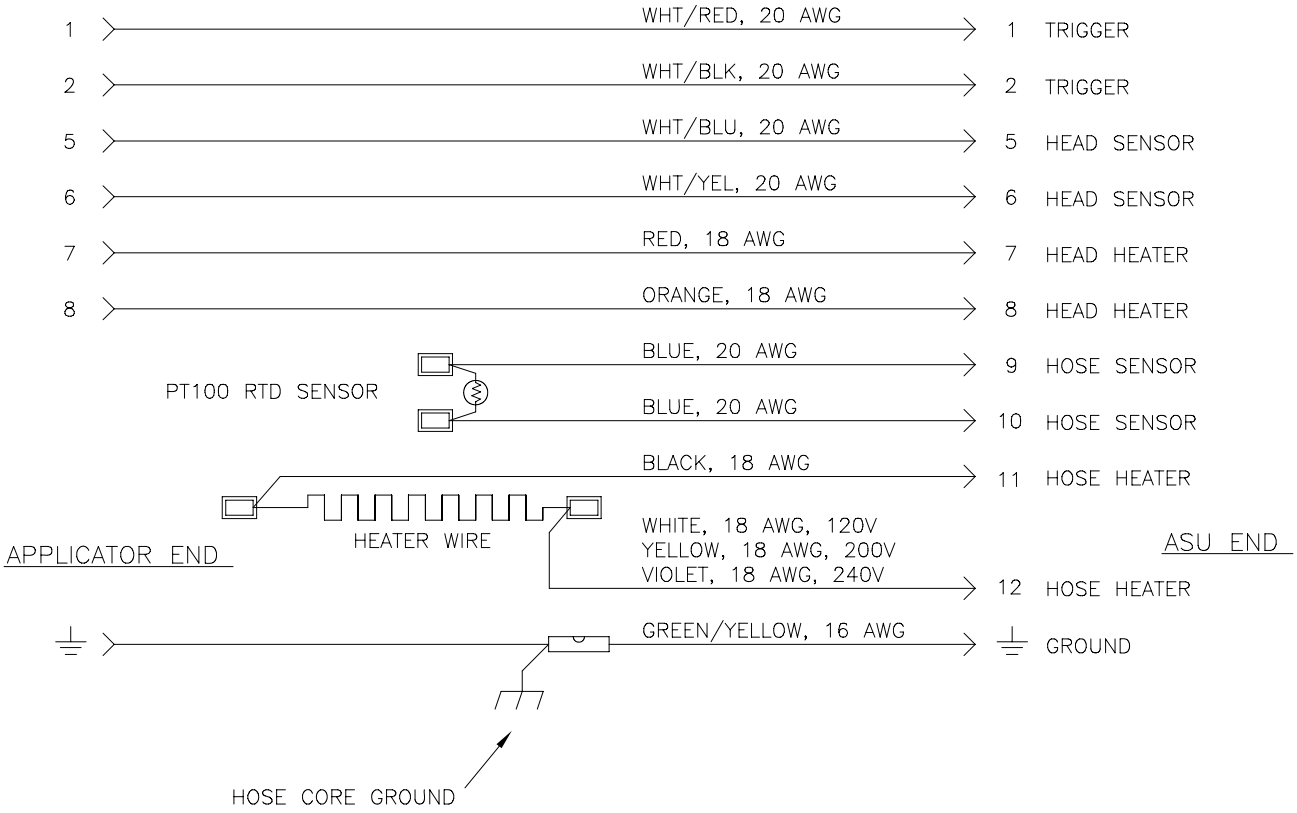


Pressure Gauge Assembly-805641

Item No.	Part Number	Description	Qty.
1	072X118	Fitting, 1/4 NPTM x #6 JIC x 90	1
2	101174	Pressure Guage, 1000 PSI	1
3	104325	Fitting Adapter, Swivel, 6J x 1/4 MPT	1
4	805632	Fitting, 1/4 NPT 1/2-20 Tranducer	1

Chapter 11
SCHEMATICS & ENGINEERING DRAWINGS

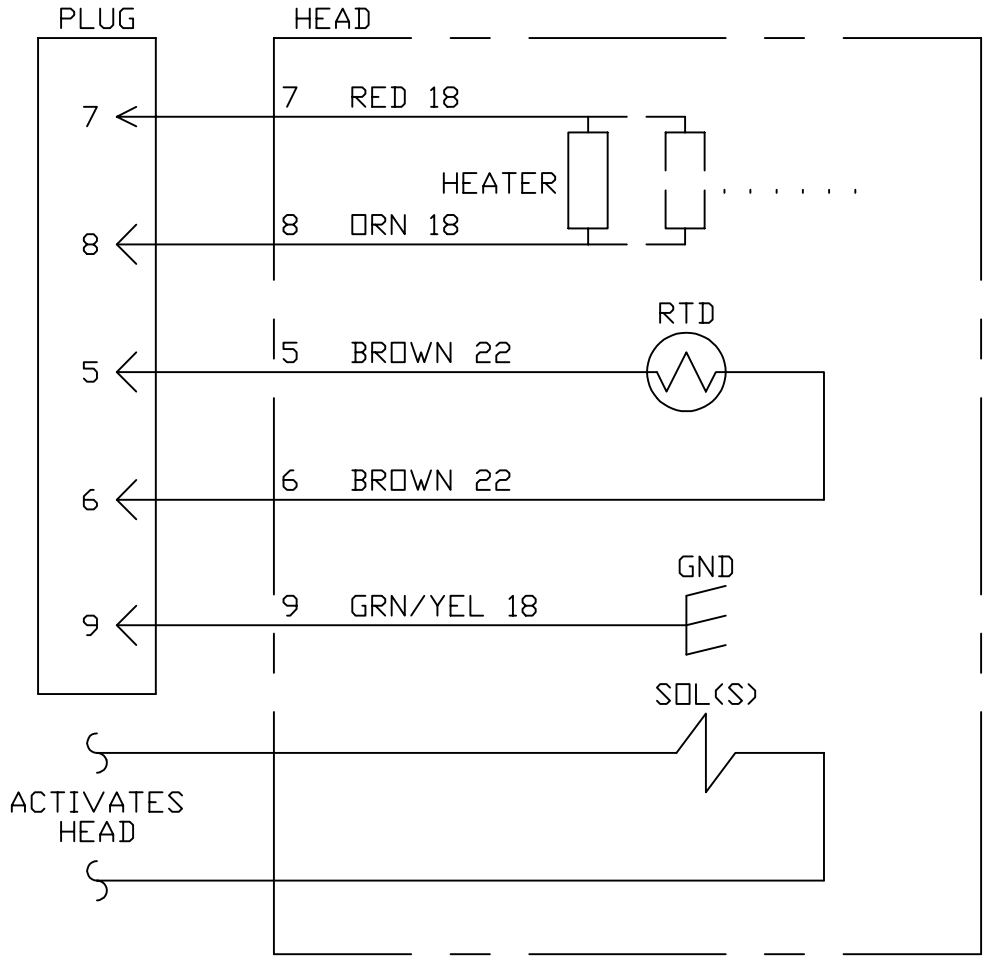
Drawing:	***Found on:***
Hose Schematic, ASU to Applicator	page 11-2
Applicator Head Schematic	page 11-3
Flow Diagram, Outlet Filter Manifold	page 11-4
Typical Hydraulic Schematic	page 11-5
Optional System Status Lights Schematic	page 11-5
Optional Level Control Schematic	page 11-6
Optional Electric Clutch Schematic	page 11-7
Grounding Diagram, CE Mark	page 11-8
Power Wiring Diagram, 240v	page 11-9
Signal Wiring Diagram, 4Hose/4Head, 240v	page 11-10
Power Wiring Diagram, 380v	page 11-12
Instruction Sheet for Pump & Zone Configuration	page 11-13
Special ASU Schematics (if applicable)	end of chapter



NOTES:

1. ALL WIRING IS ROUTED THROUGH THE HOSE.,
2. WIRE SIZES SHOWN ARE FOR NO. 6 AND NO. 8 HOSES UP TO 24 FT. IN LENGTH. FOR LARGER DIAMETER AND LONGER HOSES, HEATER LEAD WIRES ARE 16 AWG. OTHER WIRE SIZES, AND COLORS, MAY BE CHANGED IN SPECIAL HOSES, PER CUSTOMER REQUEST.

HOSE SCHEMATIC PN 101082 REV. G
ASU to Applicator



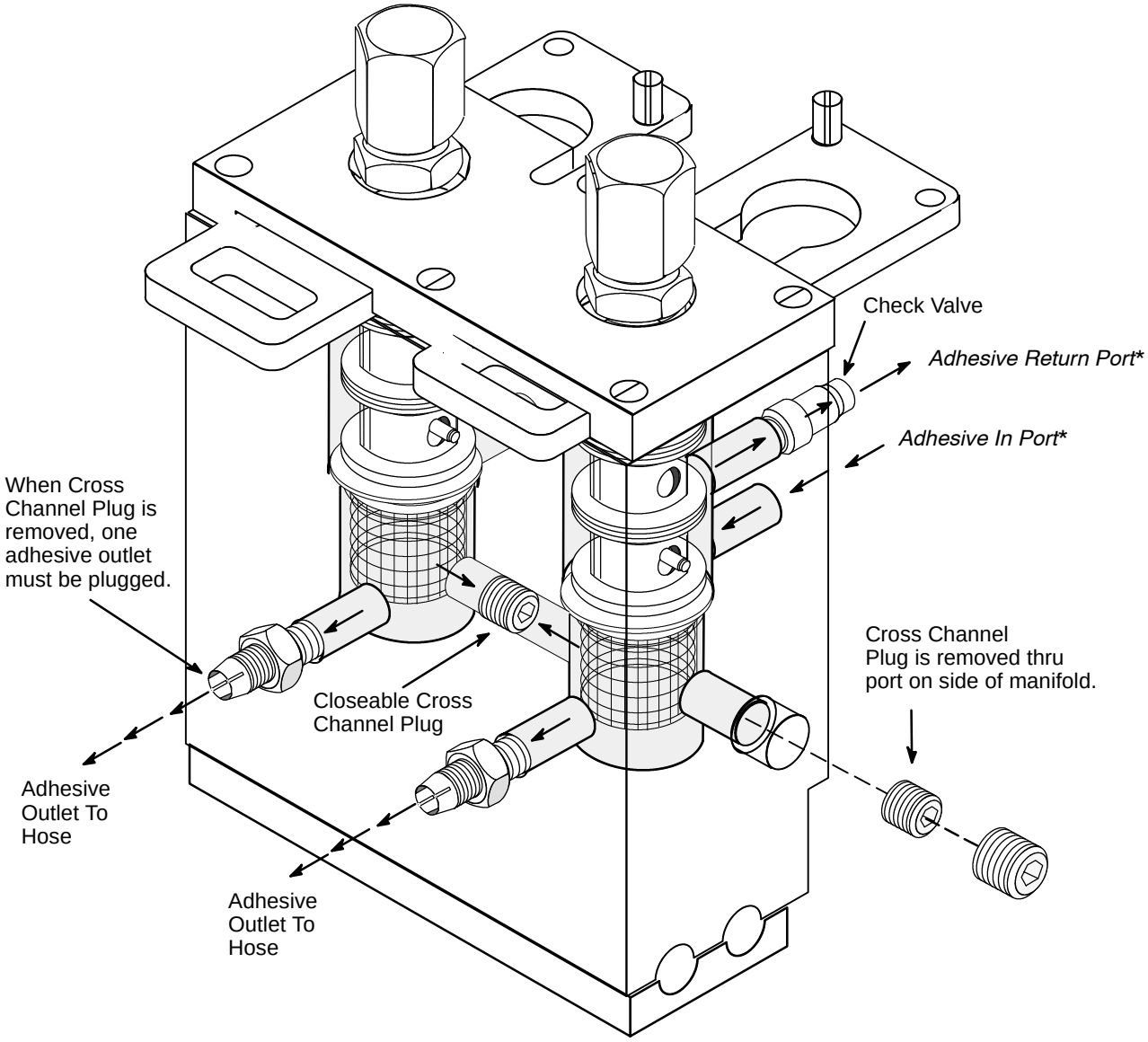
Notes:
1. ALL WIRE MIL-W-22759/10 OR 12, MINIMUM 600 VOLTS, 260 DEG. C
2. SOLENOID(S) VOLTAGE AND TIMING METHOD DEPENDS ON APPLICATION.
3. RTD WILL BE PLATINUM 100 OHM.

Function of Outlet Filter Manifold's Closeable Cross Channel

A Closeable Cross Channel Plug is located inside the Outlet Filter Manifold to prevent adhesive flow between the two outlet filters when a dual pump is in use.

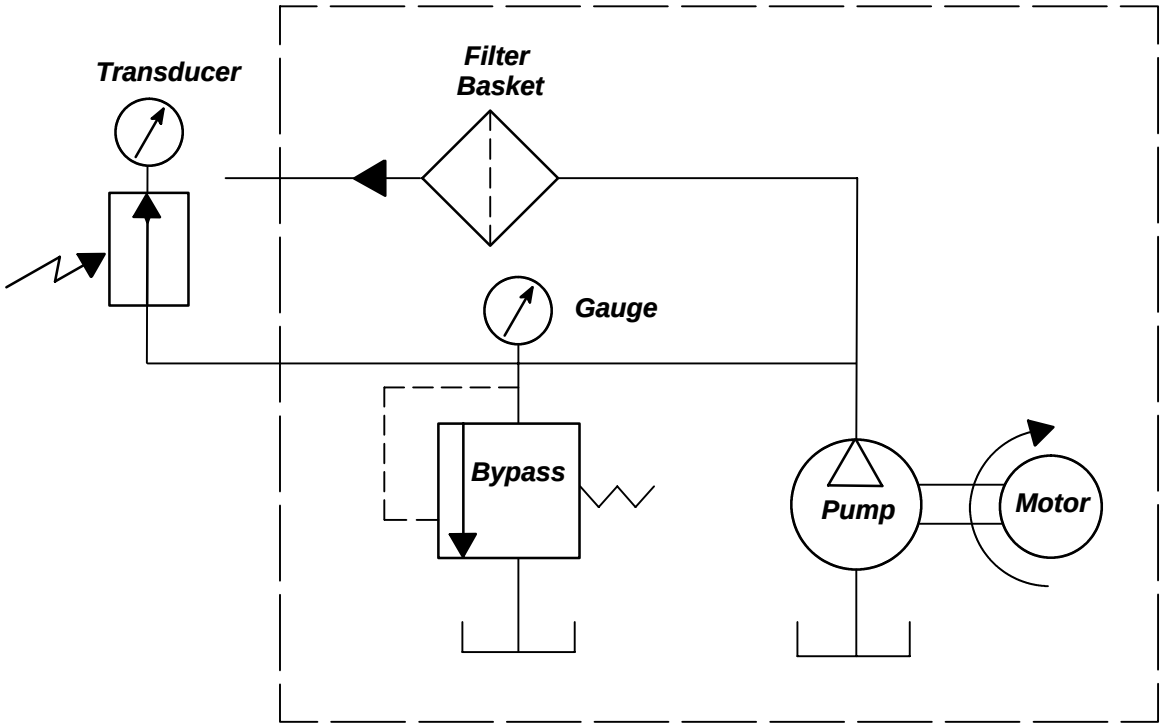
When a single pump is used, ITW Dynatec removes the Cross Channel Plug.

When changing an ASU from a single to a dual pump, or vice versa, consult ITW Dynatec for complete instructions.

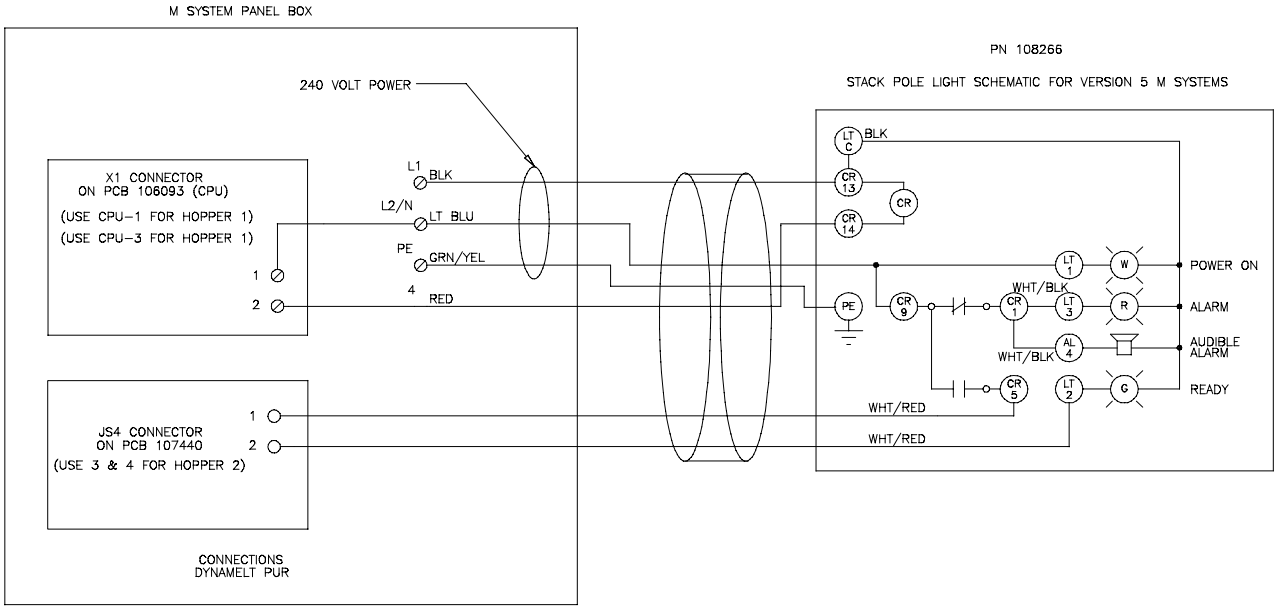

Check Valve
Adhesive Return Port*
Adhesive In Port*
When Cross Channel Plug is removed, one adhesive outlet must be plugged.
Cross Channel Plug is removed thru port on side of manifold.
Closeable Cross Channel Plug
Adhesive Outlet To Hose
Adhesive Outlet To Hose

FLOW DIAGRAM, OUTLET FILTER MANIFOLD

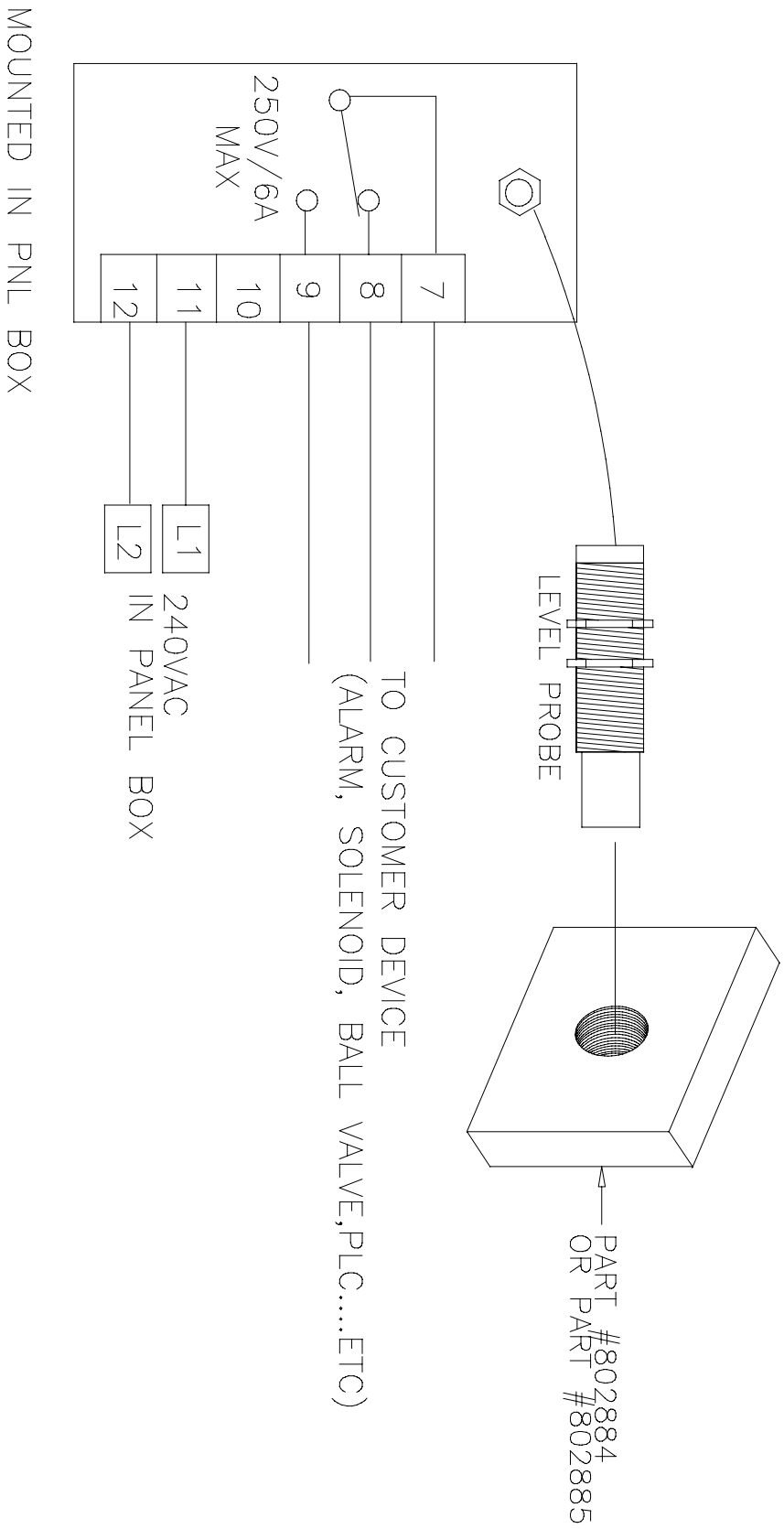
** The second Adhesive In and Adhesive Return ports are not shown.*



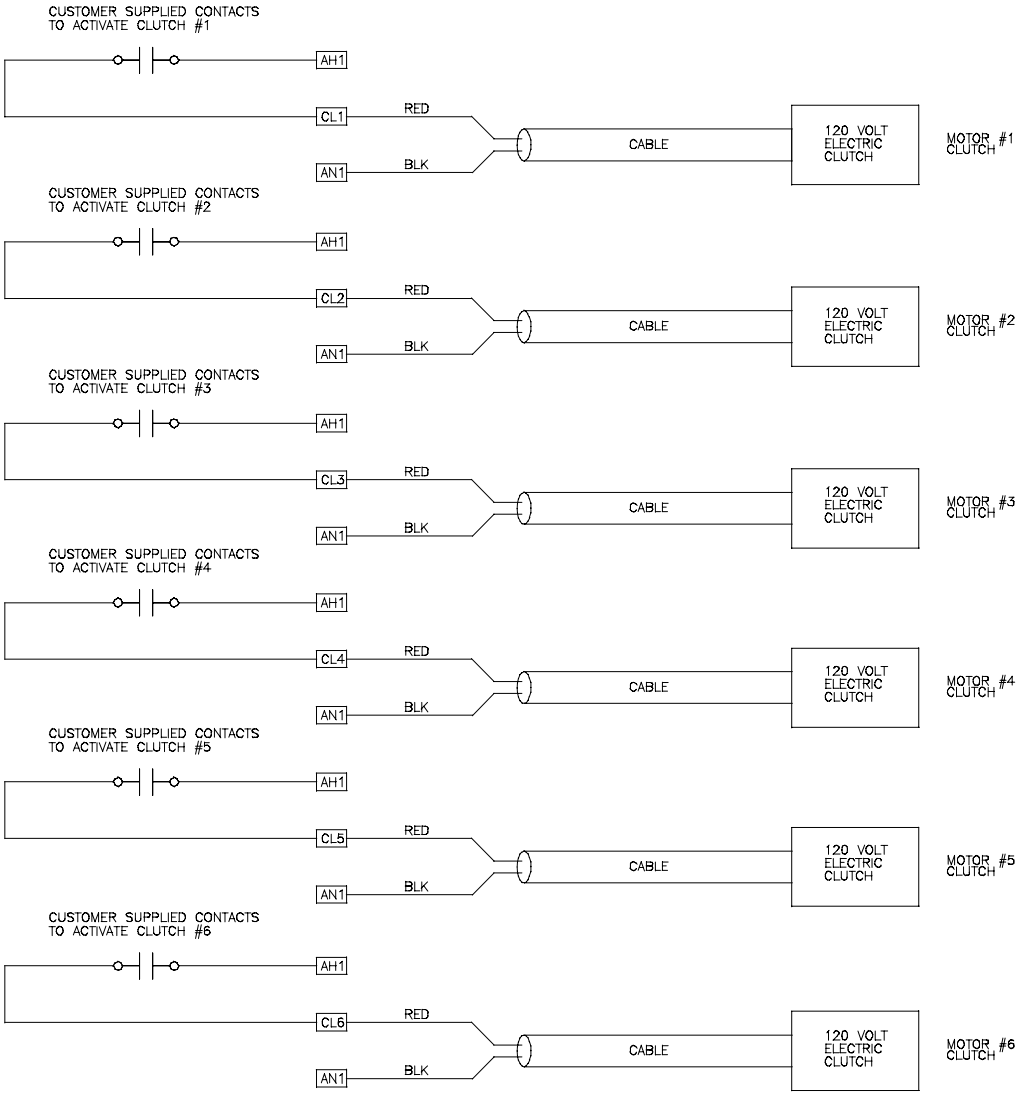
TYPICAL HYDRAULIC SCHEMATIC: Single Pump, Motor, Bypass, Filter, optional Transducer & optional Pressure Gauge



WIRING DIAGRAM FOR PN 108266 OPTIONAL SYSTEM STATUS LIGHTS



LEVEL CONTROL SCHEMATIC PN 802972 REV. A



NOTE 1: TERMINALS "AH1" AND "AN1" ARE IN PANEL BOX. TERMINALS "CL1" THRU "CL6" ARE ADDED WITH CLUTCH OPTION. MOUNT IN PANEL BOX NEAR "AH1" AND "AN1" TERMINALS. CLUTCH WILL NOT OPERATE WITHOUT CUSTOMER SUPPLIED CONTACT ON JUMPER.

NOTE 2: MOUNT CLUTCHES BETWEEN MOTOR AND PUMP SHAFTS. SECURE CLUTCHES TO ENSURE THEY WILL NOT ROTATE.

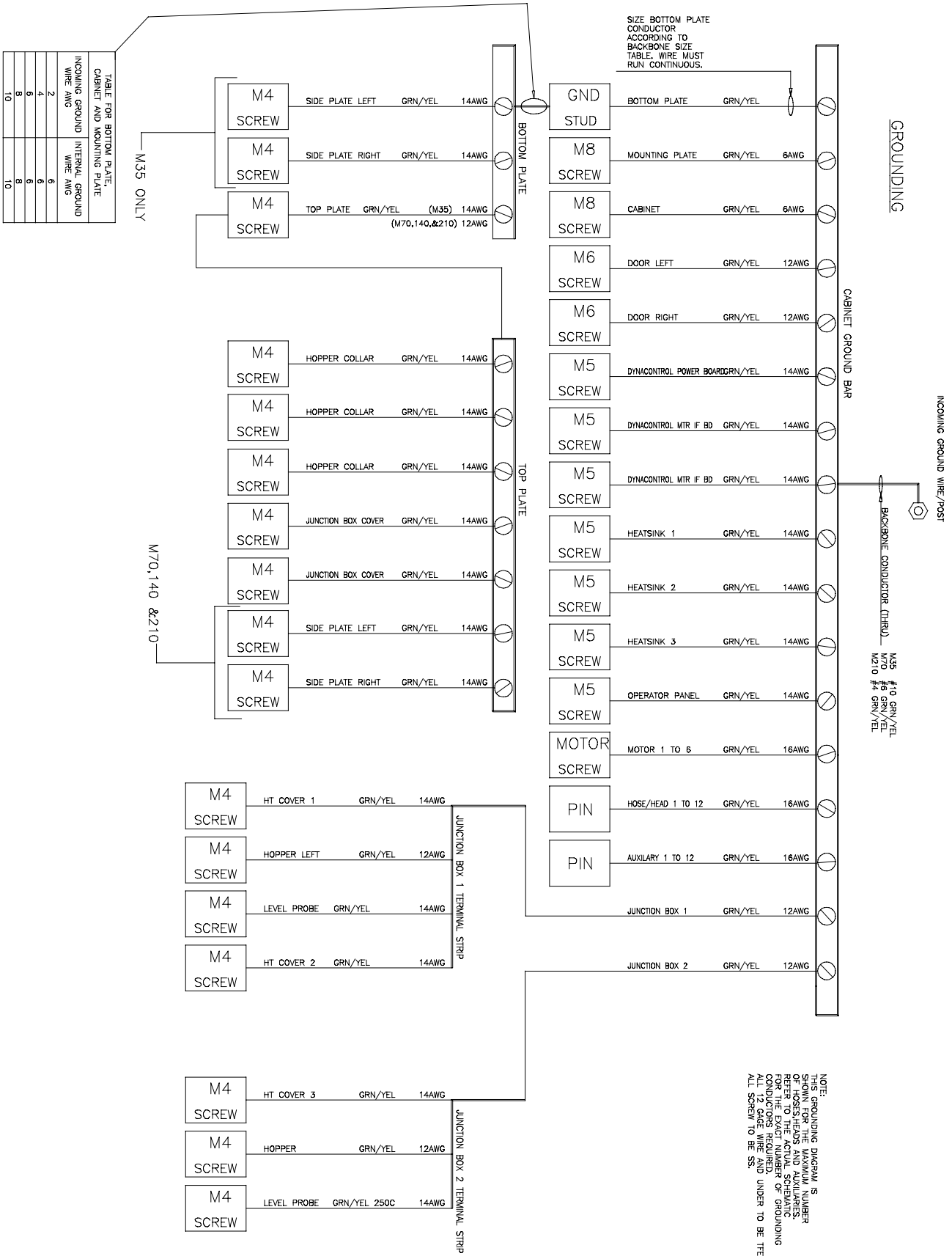
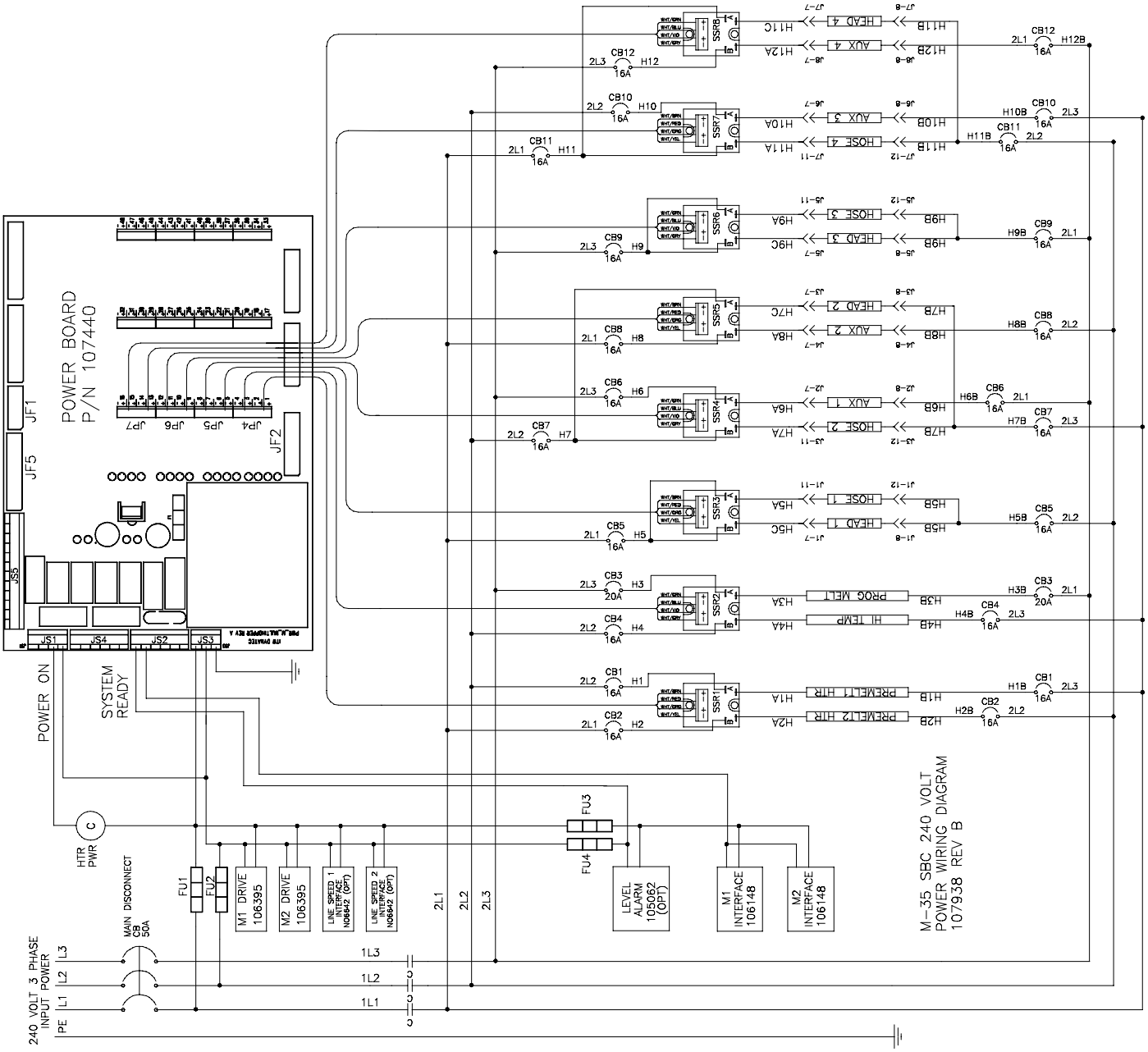


TABLE FOR BOTTOM PLATE, CABINET AND MOUNTING PLATE
INCOMING GROUND WIRE AWG
INTERNAL GROUND WIRE AWG
10 8
8 8
6 6
4 6
2 6
M35 ONLY
M70,140 &210
M4 SCREW
SIDE PLATE LEFT GRN/YEL 14AWG
SIDE PLATE RIGHT GRN/YEL 14AWG
TOP PLATE GRN/YEL (M35) 14AWG
(M70,140,&210) 12AWG
BOTTOM PLATE
TOP PLATE
HOPPER COLLAR GRN/YEL 14AWG
JUNCTION BOX COVER GRN/YEL 14AWG
HT COVER 1 GRN/YEL 14AWG
HOPPER LEFT GRN/YEL 12AWG
LEVEL PROBE GRN/YEL 14AWG
HT COVER 2 GRN/YEL 14AWG
HT COVER 3 GRN/YEL 14AWG
HOPPER GRN/YEL 12AWG
LEVEL PROBE GRN/YEL 250C 14AWG
JUNCTION BOX 1 TERMINAL STRIP
JUNCTION BOX 2 TERMINAL STRIP
SIZE BOTTOM PLATE CONDUCTOR ACCORDING TO BACKBONE SIZE TABLE. WIRE MUST RUN CONTINUOUS.
GND STUD
M8 SCREW
M6 SCREW
M5 SCREW
MOTOR SCREW
PIN
BOTTOM PLATE GRN/YEL
MOUNTING PLATE GRN/YEL 6AWG
CABINET GRN/YEL 6AWG
DOOR LEFT GRN/YEL 12AWG
DOOR RIGHT GRN/YEL 12AWG
DYNACONTROL POWER BOARD GRN/YEL 14AWG
DYNACONTROL MTR IF BD GRN/YEL 14AWG
DYNACONTROL MTR IF BD GRN/YEL 14AWG
HEATSINK 1 GRN/YEL 14AWG
HEATSINK 2 GRN/YEL 14AWG
HEATSINK 3 GRN/YEL 14AWG
OPERATOR PANEL GRN/YEL 14AWG
MOTOR 1 TO 6 GRN/YEL 16AWG
HOSE/HEAD 1 TO 12 GRN/YEL 16AWG
AUXILARY 1 TO 12 GRN/YEL 16AWG
JUNCTION BOX 1 GRN/YEL 12AWG
JUNCTION BOX 2 GRN/YEL 12AWG
CABINET GROUND BAR
GROUNDING
INCOMING GROUND WIRE/POST
BACKBONE CONDUCTOR (THRU)
M35 #10 GRN/YEL
M70 #6 GRN/YEL
M210 #4 GRN/YEL
NOTE:
THIS GROUNDING DIAGRAM IS SHOWN FOR THE MAXIMUM NUMBER OF HOSES/HEADS AND AUXILIARIES. REFER TO THE ACTUAL SCHEMATIC FOR THE EXACT NUMBER OF GROUNDING CONDUCTORS REQUIRED.
ALL 12 GAUGE AND UNDER TO BE TFE 260C.
ALL SCREW TO BE SS.

GROUNDING DIAGRAM, CE MARK, PN 804704 REV. E



PN 107938 POWER WIRING DIAGRAM, DM35 DCL, 240V

CUSTOMER INPUT

LINE SPEED INTERFACE N06642

L1 N

0-10 VOLT SPEED CTRL

RPM ENCODER

106391 CABLE ASSY, MOTOR INTERFACE TO MOTOR SPEED
SET BOTH J1 & J2 TO M2

GREY ORA MOTOR X2 SET J3 TO 5V BLU BLU X4 WEB X3 JUMPER

CPU X1 F1 L1 N X5

MOTOR CONTROL INTERFACE BOARD 106148

EMI/RFI FILTER BLK LT BLU BLK LT BLU

MOTOR SPEED CONTROL BOARD 106395

GREY ORA FSSP P1 P2 P2 L2 L1 W V LT BLU BLK BLU RED BLK

EMI/RFI CHOKE BLU RED BLK

WHT GRAY BLK

M2 1/4 HP 240V 3? AC MOTOR

CUSTOMER INPUT

LINE SPEED INTERFACE N06642

L1 N

0-10 VOLT SPEED CTRL

RPM ENCODER

106391 CABLE ASSY, MOTOR INTERFACE TO MOTOR SPEED
SET BOTH J1 & J2 TO M1

GREY ORA MOTOR X2 SET J3 TO 5V BLU BLU X4 WEB X3 JUMPER

CPU X1 F1 L1 N X5

MOTOR CONTROL INTERFACE BOARD 106148

EMI/RFI FILTER BLK LT BLU BLK LT BLU

MOTOR SPEED CONTROL BOARD 106395

GREY ORA FSSP P1 P2 P2 L2 L1 W V LT BLU BLK BLU RED BLK

EMI/RFI CHOKE BLU RED BLK

WHT GRAY BLK

M1 1/4 HP 240V 3? AC MOTOR

L1

L2/N

805115 CABLE ASSY, CPU TO MOTOR INTERFACE

108184

DISPLAY & KEYPAD

MEMORY CARD READER 101673

OPTIONAL PENDANT CONTROL

108162 CABLE ASSY, CPU TO KEYPAD

NOTE: SEE MANUAL FOR PUMP CONFIGUATION

SW1 LED1

805114

CPU BOARD

RTD EXPANSION

X11 X6 X1 X16 X9 X4 X5 J6 X2 X7 X14

4 CHANNEL PRESSURE PCB 106147

LED1 X4 X3 X2 X1 E1 E2 E3 E4 E5 E6 E7 E8 X6

PRESSURE TRANSDUCERS

CUSTOMER PRESSURE ALARM CONTACTS

TO X14

10 W/B J1-10 HOSE 1
9 GRY J1-9
8 BLU HI TEMP
7 BLU
6 W/B PROGMELT
5 GRY
4 BLU PREMELT2
3 BLU
2 BLU PREMELT1
1 BLU

TO X3

2 BLU J8-6 AUX 4
1 BLU J8-5

TO X7

12 BLU J7-6 HEAD 4
11 BLU J7-5
10 W/B J7-10 HOSE 4
9 GRY J7-9
8 BLU J6-6 AUX 3
7 BLU J6-5
6 W/B J5-6 HEAD 3
5 GRY J5-5
4 BLU J5-10 HOSE 3
3 BLU J5-9
2 BLU J4-6 AUX 2
1 BLU J4-5

TO X2

8 W/B J3-6 A2-5 HEAD 2
7 GRY J3-5 A2-6
6 BLU J3-10 HOSE 2
5 BLU J3-9
4 W/B J2-6 AUX 1
3 GRY J2-5
2 BLU J1-6 HEAD 1
1 BLU J1-5

108186

L1
L2/N

11 12 7 9

LEVEL ALARM 105062 (OPT)

CUSTOMER "POWER ON" CONTACTS (JS1)

POWER ON CONTROL

L1 L2/N

CUSTOMER "SYSTEM READY" CONTACTS (JS4)

L1 L2/N GND

READY 2TS OVERTEMP 1TS

JS5 JF5 JF1 JS1 JS4 JS2 JS3 JF7 JF6 JF5 JP4 JF2

POWER BOARD 107440

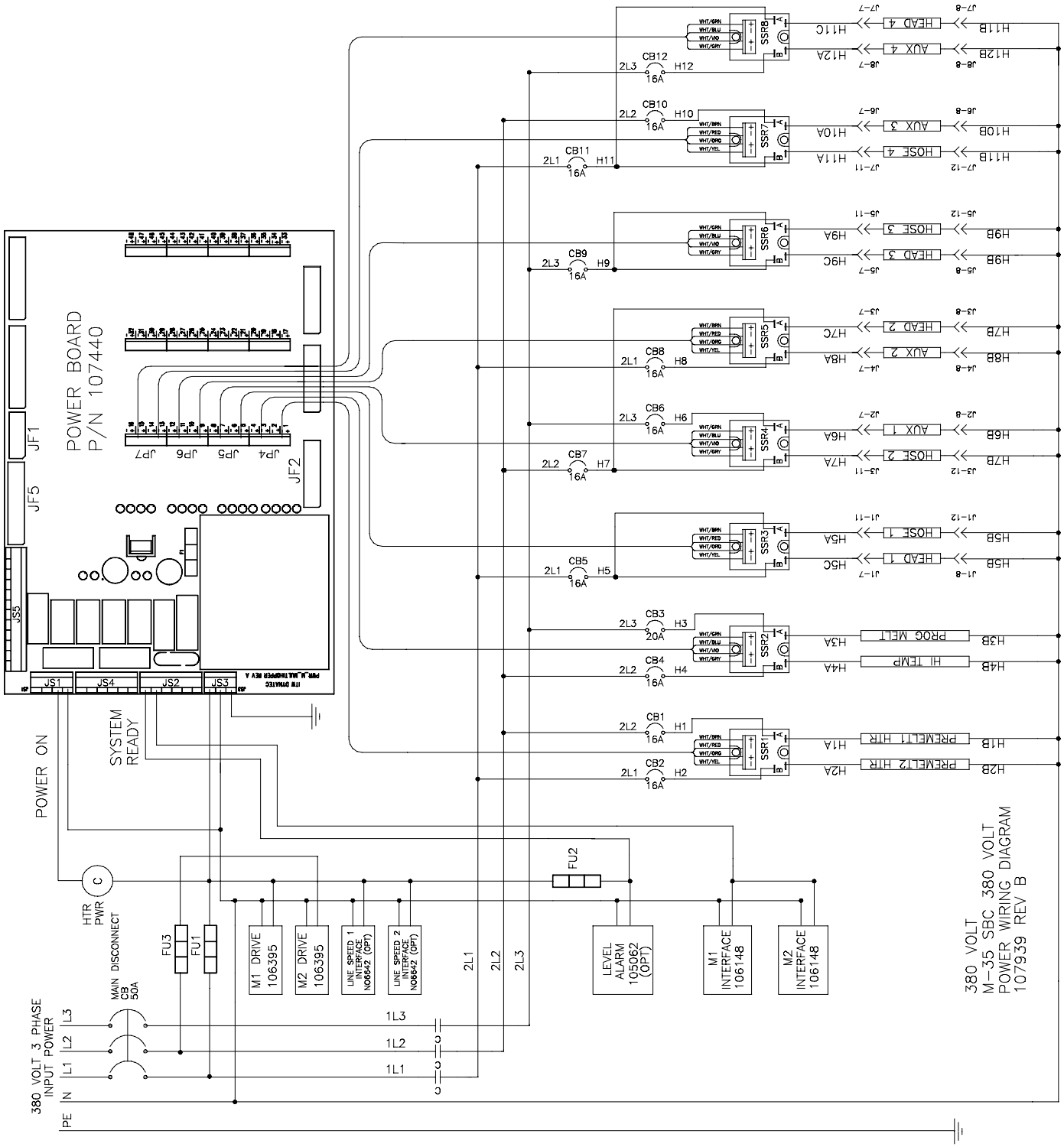
805116

M-35 SBC SYSTEM
SIGNAL WIRING DIAGRAM
200-240VAC 3ø 50-60 HZ
4 HOSE/4HEAD
107397 REV A
(OPTIONAL COMPONENTS ARE IN DOTTED LINES)

CLUTCH SOLENOID DRIVE CIRCUIT JS1 JS3 ITW DYNATEC

L1
L2/N

See previous page



PN 107939 POWER WIRING DIAGRAM, DM35 DCL, 380V

Zone Configuration for Hose/Head/Aux.

M35

Hose	1	2
Head	2	3
Aux.	3	4
1	5	8
2	6	9
3	7	10
4		

Hose	1	2	3	4
Head	5	8	11	14
Aux.	6	9	12	15
5	7	10	13	16
6				

M70/140

(2) Hose	1	2
Head	3	4
Aux.	5	6
1	11	14
2	12	15
3	13	16
4		

(4) Hose	1	2	3	4
Head	11	14	21	24
Aux.	12	15	22	25
5	13	16	23	26
6				

(6) Hose	1	2	3	4	5	6
Head	5	8	11	14	21	24
Aux.	6	9	12	15	22	25
1	7	10	13	16	23	26
2						

(8) Hose	1	2	3	4	5	6	7	8
Head	5	8	11	14	21	24	27	30
Aux.	6	9	12	15	22	25	28	31
1	7	10	13	16	23	26	29	32
2								

M210

(2) Hose	1	2
Head	3	4
Aux.	5	6
1	21	24
2	22	25
3	23	26
4		

(4) Hose	1	2	3	4
Head	21	24	27	30
Aux.	22	25	28	31
5	23	26	29	32
6				

(6) Hose	1	2	3	4	5	6
Head	5	8	11	14	21	24
Aux.	6	9	12	15	22	25
1	7	10	13	16	23	26
2						

(8) Hose	1	2	3	4	5	6	7	8
Head	5	8	11	14	21	24	27	30
Aux.	6	9	12	15	22	25	28	31
1	7	10	13	16	23	26	29	32
2								

(10) Hose	1	2	3	4	5	6	7	8	9	10
Head	5	8	11	14	21	24	27	30	37	40
Aux.	6	9	12	15	22	25	28	31	38	41
1	7	10	13	16	23	26	29	32	39	42
2										

ⓒ

(12) Hose	1	2	3	4	5	6	7	8	9	10	11	12
Head	5	8	11	14	21	24	27	30	37	40	43	46
Aux.	6	9	12	15	22	25	28	31	38	41	44	47
1	7	10	13	16	23	26	29	32	39	42	45	48
2												

ⓒ

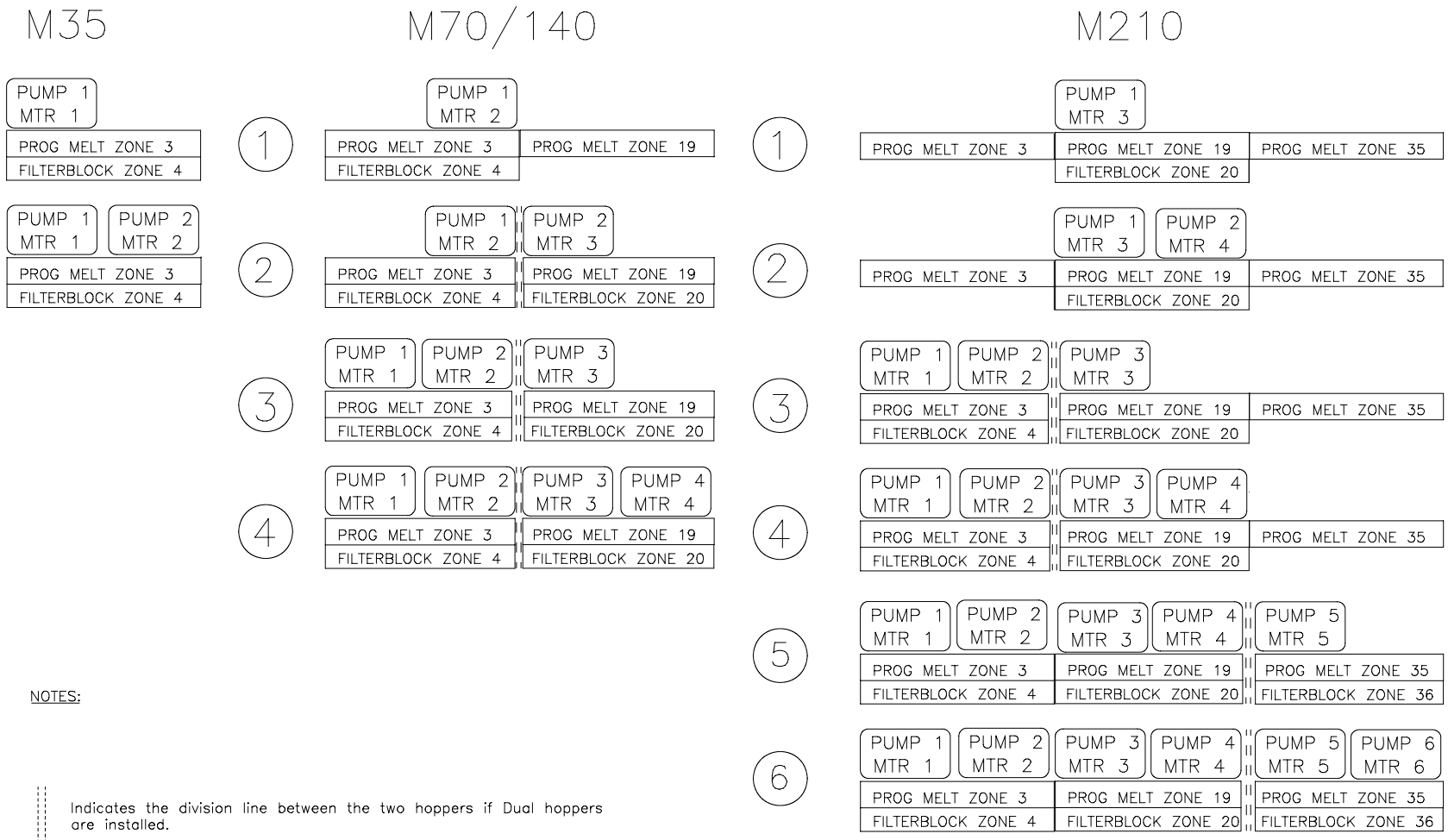
NOTES:

There are no odd hose numbers in the predefined defaults. If for example 5 hoses are installed, the default has to be loaded for 6. If necessary remove hose #6 manually from the zone table.

- - - - - - Indicates the division line between the two hoppers if Dual hoppers are installed.

These zone numbers are independent from number of pumps and premelt grids

Zone Configuration for Prog Melt / Filterblock / Pumps



NOTES:

Indicates the division line between the two hoppers if Dual hoppers are installed.

Zone Configuration for Premelt Grids

M35 – 1 PREMELT

PREMELT 1 ZONE 2

M70/140 – 2 PREMELTS

PREMELT 1 ZONE 2	PREMELT 2 ZONE 18

M210 – 3 PREMELTS

PREMELT 1 ZONE 2	PREMELT 2 ZONE 18	PREMELT 3 ZONE 34

M35 – 2 PREMELTS

PREMELT 1 ZONE 1
PREMELT 2 ZONE 2

M70/140 – 4 PREMELTS

PREMELT 1 ZONE 1	PREMELT 2 ZONE 17
PREMELT 3 ZONE 2	PREMELT 4 ZONE 18

M210 – 6 PREMELTS

PREMELT 1 ZONE 1	PREMELT 2 ZONE 17	PREMELT 3 ZONE 33
PREMELT 4 ZONE 2	PREMELT 5 ZONE 18	PREMELT 6 ZONE 34

NOTES:

Indicates the division line between the two hoppers if Dual hoppers are installed.

DYNATEC/ ZENITH STANDARD ACCURACY GEAR PUMPS INSTALLATION, CARE & MAINTENANCE MANUAL

PN 084E427, 084E429, 084E431, 084E433, 084E435, 084E437

Part Number	Material	Type/Accuracy	Output/Rev	Shaft Seal PN
084E427	Nodular Iron	Single/ Standard	0.29cc	069X251
084E429	Nodular Iron	Single/ Standard	1.17cc	069X251
084E431	Nodular Iron	Dual/ Standard	1.17cc	069X251
084E433	Nodular Iron	Single/ Standard	2.92cc	069X251
084E435	Nodular Iron	Dual/ Standard	2.92cc	069X251
084E437	Nodular Iron	Single/ Standard	8.5cc	069X251

Thoroughly read and understand this entire manual before installation and operation of pump.

Note: The instructions given herein cover the description, installation, operation and maintenance of subject equipment. Dynatec and Zenith reserve the right to make engineering refinements that may not be reflected in this bulletin.

Manual revised 8/94

INTRODUCTION

In 1926, Zenith Pumps was appoached by the synthetic fiber industry to design a pump to provide a precise, pulseless, repeatable flow and assure better quality control. The options then were the same as those in the chemical process industry today: diaphragm, lobe, coarse gear, piston, plunger and screw pumps. Each had problems with pulsation, flow inaccuracies, multiple seal areas and slippage, which required constant calibration, high maintenence and extended downtimes.

Zenith Pumps met the challenge and designed a rotary external gear pump of unique precision and simplicity. Manufacturing techniques were developed to hold tolerances to .00005", and an internal pressure relief mechanism assured reliable precision metering. The pump's simple design of only three moving parts - two metering gears and a drive shaft - provided long life and easy maintenance.

For years since, chemical engineers have relied on Zenith to provide precision fluid handling solutions for their most difficult pumping applications. Zenith gear pumps can be found wherever precise, pulseless, repeatable metering of fluids is required.

BENEFITS

High Accuracy
Stable, repeatable flows are assured even under varying conditions of pressure, viscosity and temperature.

High Temperature Capability
Operating temperatures to 450 degrees F (232 degrees C).

Maximum Life
Only three moving parts; components are through-hardened tool and die steels to 56 HRc or better. The bodies are cast nodular iron. Replaceable sleeve bearings for low-cost rebuilds.

High Volumetric Efficiency
Maximum efficiency is achieved with optimum operating clearances and assured under pressure by built-in alignment pins.

Minimum Pulsation
Unique design offers virtually pulseless flow without valves or flexible elements to hinder performance.

Precision Construction
Ground and lapped components for close control of operating clearances.

SPECIFICATIONS

Pump Type: Rotary external spur gear, single stream.

Rotation: Clockwise

Operating Speed: 3 - 120 rpm depending upon application conditions and fluid viscosity.

Temperature: To 450 degrees F (232 degrees C)

OPERATION

All Dynatec/ Zenith High Accuracy Pumps are rear ported. Fluid enters the pump through a port drilled into the rear side plate (the side opposite the drive shaft). The fluid fills the exposed gear tooth volumes and is transported around the outer diameter of the gear pocket. As the gears mesh together, the fluid is displaced in a very precise amount out through the discharge port that is drilled alongside the inlet port in the rear plate.

Since these pumps are not self-priming, a flooded suction is usually the minimum inlet pressure required. However, when high-viscosity fluids are used, more time is required to fill the tooth volumes. As a result, the inlet pressure must be increased, or the gears must rotate at a slower speed to ensure complete volume filling and to prevent cavitation.

Dynatec/ Zenith pumps rely on the metered fluid for lubrication of internal bearing areas. The pump should never be allowed to run dry or be allowed to run with non-lubricating fluids such as water. Because of the close clearances in the bearing areas, lack of sufficient lubrication can cause pump seizure or some other catastrophic failure.

Slippage will occur across the faces of the gears from the high-pressure side to the low-pressure side. The amount of slippage depends on four factors: fluid viscoisty, speed, differential pressure and pump clearances. Under reasonably stable operating conditions, slippage is repeatable and predictable and pump operation can be adjusted to compensate.

The Standard Accuracy Pumps are designed for high-temperature and high-pressure operation. As such, operating temperatures to 450 degrees F can be achieved.

INSTALLATION

Pumps should be carefully unpacked to make sure that the shipment is complete. If any items are missing or damaged, the freight carrier and Dynatec should be notified immediately.

While the pump is composed of steel, it is a precision instrument. Dropping the pump or hitting with a non-yielding material can cause serious damage to the components. All materials are through-hardened to maximum hardness resulting in brittle material. Treat *cont.*

them as you would any other precision gauging instrument.

Dynatec/ Zenith pumps are shipped filled with a rust preventive oil. Flush the oil throughly with a cleaning solvent. It may be necessary to disassemble the seal arrangement to remove all traces of the oil, but disassemble only if necessary.

After flushing, the pump should be lubricated internally for start-up purposes. Pour a suitable high-temperature lubricant (silicone oil) into the inlet port. Rotate the metering gears until lubricant appears at the discharge port.

Mount the pump to a block with a flatness of true flat to .0001" convex and a surface finish of 4 to 8 rms to prevent leakage between the pump and block. Mounting bolts should be a Grade 8 or better. Make sure mounting bolts are lubricated with a high-temperature anti-seize compound such as DAG Dispersion #154. Bolts should be alternatively torqued in even increments up to Dynatec's recommended limit for the bolt size used. See Table 1 on page 10 for torque values.

The following is a brief "standard" installation procedure. For any special applications, considerations or simply to ask our advice, please contact Dynatec.

TO PREPARE THE PUMP FOR USE:
1. Always flush out the plumbing system before connecting the pump.
2. Filters should be installed prior to the pump inlet that filter ideally to half the pump running clearances.
3. Turn pumps by hand before running. Pumps should turn freely.
4. Engage the outer drive shaft carefully, making sure that it does not bottom in the slot of the coupling* and that it is aligned within one degree angular and .005" parallel with the true pump drive axis. (*Note: the coupling is the rotating member of the seal and depends on the internal operating pressure of the pump to force it forward and effect a seal against the carbon or metal seal plate.)
5. Tighten the mounting bolts and coupling housing screws to Dynatec recommended torque at room temperature.
6. Make sure fluid is in the pump before starting.
7. Start pump slowly and, if possible, run it with a lubricating fluid.
8. When satisfactory operation is achieved, the pump and system may be gradually brought up to normal process speeds and pressures.
9. If at any time during operation the pump does not appear to be running smoothly, stop the pump immediately to avoid any serious internal damage.

CLEANING, INSPECTION AND REPAIR

REMEMBER: Dynatec/ Zenith metering pumps are made for exacting duty. In order to develop the high pressure demanded, the clearance between the metering gears and their housing must be as small as possible, yet large enough to allow adequate lubrication. All parts are machined to extreme accuracy; critical dimensions are held between one and two ten-thousanths of an inch (.0001"/ .0002"). Because of these close running clearances, *cont.*

these pumps require careful maintenence and handling, especially of component parts. The slightest burr, nick or particle of foreign matter can cause scoring or even seizure. These pumps are precision instruments; you can't keep them too clean. Please treat them with care, and if it's at all possible, set aside a separate clean area for pump maintenance.

To clean High Accuracy Metering Pumps, place them in a suitable furnace and gradually heat in an inert atmosphere for the initial hour to prevent flashing of the polymer. Time at temperature will be related to the pump size and the degree of polymer contamination and should be determined by trial. Note: Careful control of he furnace temperature (700 degrees F max.) and atmosphere is critical. Should the temperature exceed the original tempering temperature, the steel hardness will draw back and the dimensional stability of the pump may be upset.

Another acceptable cleaning method is to immerse the pump in a fluidized bed cleaning bath. The bath shold be heated to a temperature that is sufficient to carburize the polymer. The carburization process usually takes between 3 and 12 hours, depending on the polymer type, temperature, pump size and furnace load.

CAUTION: Avoid exposing the pump to thermal shock when using this method of cleaning.

After gradually cooling to room temperature, the pump should be thoroughly flushed in a clean solvent. It may be necessary to disassemble the seal arrangement to remove polymer ash.

If present, always replace the carbon seal plate after pump burnout. If the pump was performing satisfactorily when removed from service and still turns freely after burnout, pressure test it and add a high-temperature lubricant to prepare it for return to service. To store for future use, simply add a rust preventative oil.

It is recommended that pump users institute a program of dimensional inspection of critical parts in order to keep maintenence and operting costs at a minimum. By noting the performance of a pump immediately before removing it from service and correlating the performance to measured component wear, the user can establish the maximum wear limits for the pump's critical components. Further, he can predict the service life of the pump and schedule his down-time accordingly.

As with any other Dynatec pump, high accuracy pumps may be returned to Dynatec for complete rehabilitation as necessary. This procedure may be desirable if only a few pumps are involved. If a large number of pumps are to be maintained at the user's plant, it may be worthwhile to have key personnel attend a maintenance seminar at the Zentih factory to view the manufacturing, gauging and assembly techniques involved in producting the pumps. Please contact Dynatec (at 1-800-538-9540) for further information on these items.

STANDARD ACCURACY PUMP DISASSEMBLY

If pumps are to be disassembled on a regular basis, we recommend that you establish a pump room with all the necessary tools and equipment for disassembly and cleaning with a separate "clean" area for assembly, testing and storing of rebuilt pumps.

If maintenence is required due to low delivery or seizure, the following procedure is recommended for disassembly.

NOTE: Be sure to note the location and orientation of all parts to ensure correct re-assembly. Refer to assembly drawing (located in the back of this manual) for your correct pump type.

1. Remove the seal arrangement.
2. Remove all binder screws.
3. Remove pins (10) and arbor (5) with an arbor press in the direction which disengages the press fit in the shortest distance.

NOTE: Dowels and arbors for the standard accuracy pumps are press fit in the gear/ rear plate.

4. Separate the plates by pry slots that are available in the pump. Great care should be taken not to scratch or damage the internal pump surface when prying the plates apart.
5. After disassembly, clean all components in a non-destructive solvent.
6. Wash components in an ultrasonic cleaning tank and air dry. Be careful not to bang parts together.
7. Inspect all parts for nicks, burrs, score marks and other signs of wear. The plates and faces of the gears may be hand blocked on 600 grit paper and any nicks, burrs or sharp edges can be lightly removed with a honing stone. Be careful not to round off the edges of the gear teeth while lapping.

CAUTION: Since the thickness relationship between the metering gears and the gear/ rear plate is critical to metering performance, and the gear/ rear plate is non-wearing on its sides, lapping these components is not necessary and should not be done under any circumstances.

Place a layer of 600 Grit Emery Cloth on a lapping block or plate-a granite flat is suitable. Apply light pressure to the component and turn it in a figure-8 fashion (as shown in Figure 1) approximately five times until a smooth finish appears. Turning in a circular fashion, or other non-uniform motion, may cause the ground holes to lose their perpendicularity to the faces.

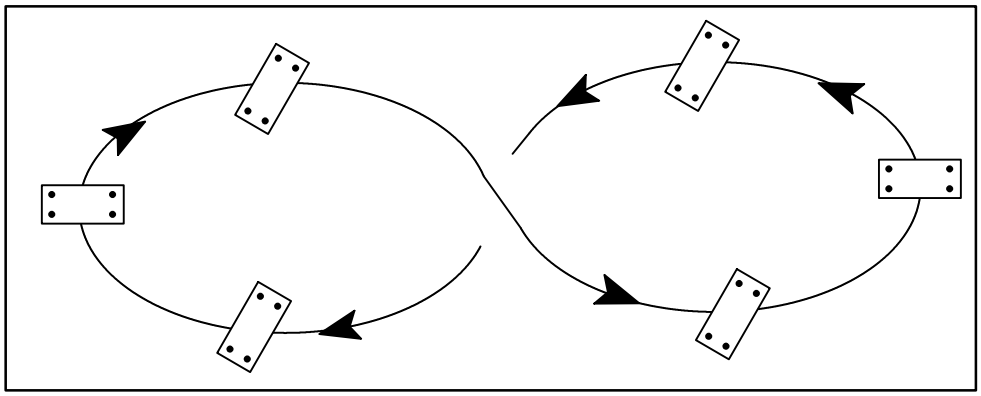
Always use clean, lint-free rags and compressed air to clean components. Paper towels are not acceptable; they may leave small pieces of paper and dust on the components. Use chemical brushes to clean between gear teeth, bores and reliefs.

8. Replace sleeve bearings as necessary and hone in the plate to the original new part specifications.
9. After each resurfacing, carefully gauge the area between the inlet and discharge ports at the mesh of the gears. This area, commonly referred to as the "throat", is the most critical part of the plate. Scoring or wear marks here will allow increased slippage from the *cont.*

high-pressure discharge port section across the throat to the lower inlet port, reducing efficiency. Therefore, carefully gauge this area for flatness after each resurfacing.

10. After all components are “hospital clean”, the pump is ready for assembly.

Figure 1



STANDARD ACCURACY PUMP RE-ASSEMBLY

NOTE: During and between each re-assembly step, manually turn the metering gears to ensure that they are free turning. If binding occurs at any time, determine the cause and correct it immediately. A tiny nick, burr or foreign particle can extensively damage a valuable pump component. Never use force in re-assembling or turning a Dynatec pump. If properly aligned, the pieces will fit easily into place and the pump will turn freely. Re-assemble as follows:

1. After all worn parts have been re-finished or replaced, all parts should be throughly cleaned in a solvent and dried.
2. Using the driven gear (5) as an up-righting fixture, carefully locate the arbor (7) over its press-fit hole in the gear/ rear plate. Smoothly drive the arbor into its hole with the help of an appropriate arbor press.
3. Place the gear/ rear plate (1) with the arbor in position in a soft-jaw vise or holding fixture.
4. Slip together the driving metering gear (6), drive shaft (4), key (8) and retaining rings (21). Position in the front of the gear/ rear plate.
5. Place the driven metering gear on its arbor and carefully mesh with the drive metering gear.
6. **NOTE**: Repeat steps 3 through 5 for four-gear pumps.
7. Position the front side plate (3).
8. Rotate the gears to ensure free rotation.
9. Press the roll pins (41) into place.
10. Lubricate the binder screws (23) with DAG dispersion #154 or a similar heat resistant lubricant and install. Torque the screws in even increments to the manufacturer’s recommended limit. It is especially important to rotate the gears frequently during this operation.
11. Re-assemble the seal arrangement, making sure the sealing surfaces are perfectly clean and free of scratches, nicks or burrs. When a carbon seal plate is used, always use a new carbon seal that has been lightly polished on 600 grit paper. When using a carbon seal, the coupling housing screws (27) should be torqued to the manufacturer’s recommended limit. For pumps with a compensation packing seal, be sure all old packing is removed *cont.*

from the packing housing.

12. Inspect the drive shaft at the seal area making sure that it is not scored, shouldered or worn. Worn shafts will result in premature seal leakage and should be replaced.

13. Inspect lip seals for wear, cracks and abrasions. Replace if needed.

14. Pack lip seals (15) with a silicone-based grease and lubricate with Parker Super-O-Lubricate or an equivalent silicone-based oil.

15. Install lip seals (15) into seal housing (9) as shown.

16. Tighten seal housing screws (22) in a cross pattern to 60 lbs./in. Check for free rotation.

SCREW TORQUE VALUES (Standard Alloy Steel)*

Screw Size & Thread (UNC Alloy Steel)		**Torque (Lubricated Threads)** Lbs.-in.	Nxm	Lbs.-ft.
#10-24 (w/ carbon seal gasket)		[50]	5.7	[4.2]
#10-24 (w/o carbon seal gasket)		[64]	7.2	[5.3]
#12-24		[120]	13.6	[10]
1/4-20		[150]	16.9	[12.5]
5/16-18		[305]	33.9	[25]
3/8-16	*into aluminum*	[360]	40.6	[30]
7/16-14	*block (hopper)*	[480]	54.2	[40]

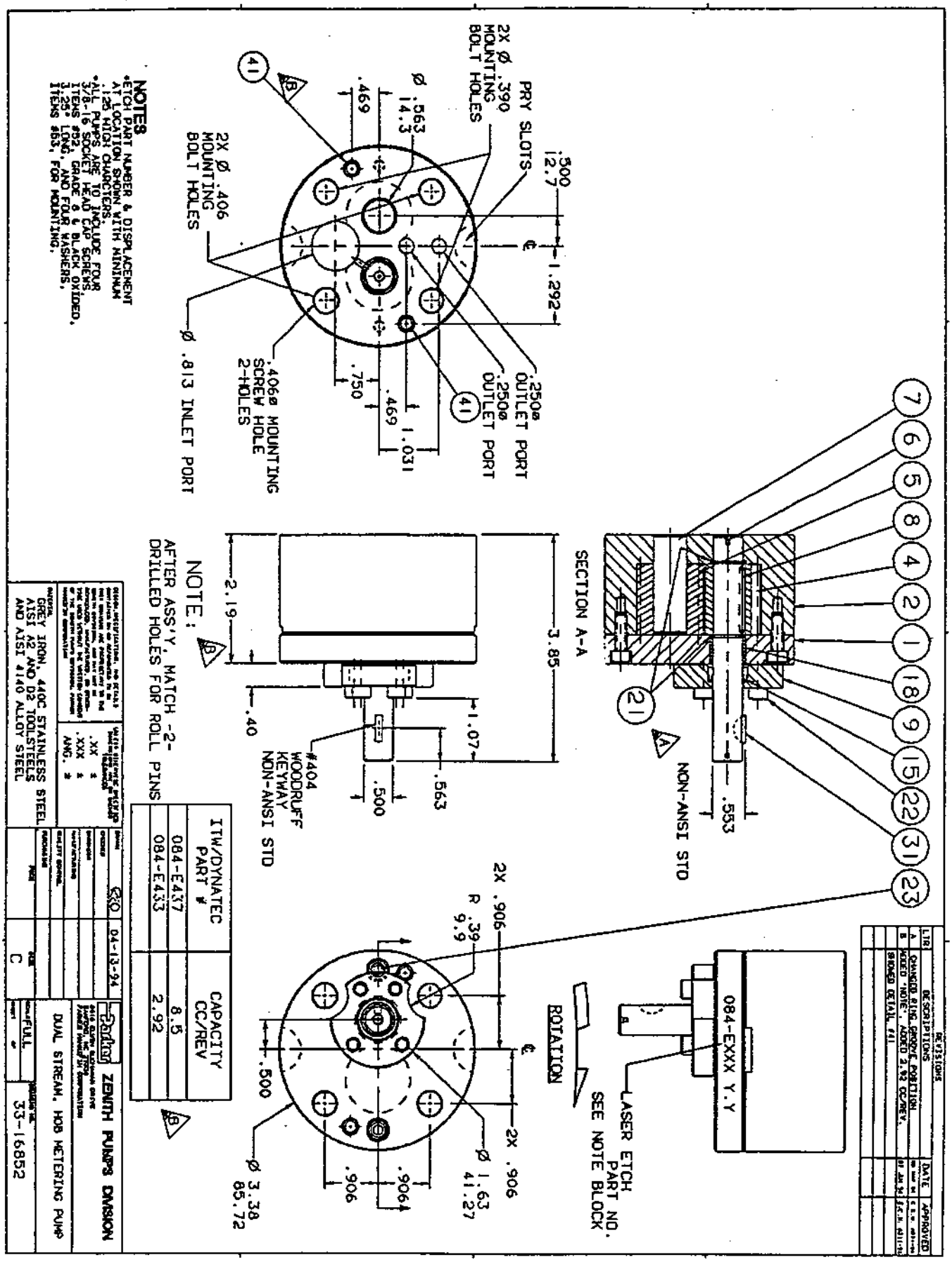
Table 1

*In critical applications where control of bolt preload is important, the torque-tension relation should be determined by experimenting on the actual parts involved (including thread lubricants). At elevated temperatures, it is often desirable to reduce screw stress because of deformation (creep) under sustained loading. Screws constructed of type H-11 high-temperature alloy steel provide extremely high creep resistance.

TROUBLESHOOTING GUIDE

Trouble	*Probable Cause*	*Remedy*
Pump will not turn.	1. Low pump temperature.	Check temperature sensor and control loop for proper setting/ operation. Allow sufficient heat-up time.
	2. Drive malfunction.	Verify drive is powered. Check to assure all alarm circuits are clear. Check drive motor current and speed settings. Check all drive couplings.
	3. Process conditions changed.	Check process conditions for proper melt temperature, pressures, viscosities and materials.
	4. Entrained particle.	Return pump to ITW Dynatec for repair.
	5. Possible internal damages.	Return pump to ITW Dynatec for repair.
Excessive seal assembly leakage	1. Worn seal plate.	Return pump to ITW Dynatec for repair.
	2. Insufficient inlet pressure.	Increase inlet pressure.
	3. Worn lip seal.*	Replace lip seal.
Reduced pump efficiency	1. Worn gear(s).	Return pump to ITW Dynatec. for repair.
	2. Worn bearings.	Return pump to ITW Dynatec. for repair.
	3. Process conditions changed.	Consult factory for clearance recommended on new process conditions.

** A minor seal leak or weep is not abnormal and may be desirable for lubricating the seal surfaces.*


NOTES
ETCH PART NUMBER & DISPLACEMENT AT LOCATION SHOWN WITH MINIMUM .125 HIGH CHARACTERS.
ALL PUMPS ARE TO INCLUDE FOUR 3/8-16 SOCKET HEAD CAP SCREWS, ITEMS #52, GRADE 8 & BLACK OXIDED, 3.25" LONG, AND FOUR WASHERS, ITEMS #63, FOR MOUNTING.
2X Ø .406 MOUNTING BOLT HOLES
Ø .813 INLET PORT
.406ø MOUNTING SCREW HOLE 2-HOLES
2X Ø .390 MOUNTING BOLT HOLES
PRY SLOTS
.250ø OUTLET PORT
.250ø OUTLET PORT
Ø .563 14.3
.469
.500 12.7
1.292
.750
.469
1.031
SECTION A-A
NON-ANSI STD
.553
3.85
1.07
.563
.500
#404 WOODRUFF KEYWAY NON-ANSI STD
2.19
.40
NOTE:
AFTER ASS'Y, MATCH -2- DRILLED HOLES FOR ROLL PINS
ITW/DYNATEC PART #
CAPACITY CC/REV
084-E437
8.5
084-E433
2.92
2X .906
R .39 9.9
.500
.906
.906
2X .906
Ø 1.63 41.27
Ø 3.38 85.72
ROTATION
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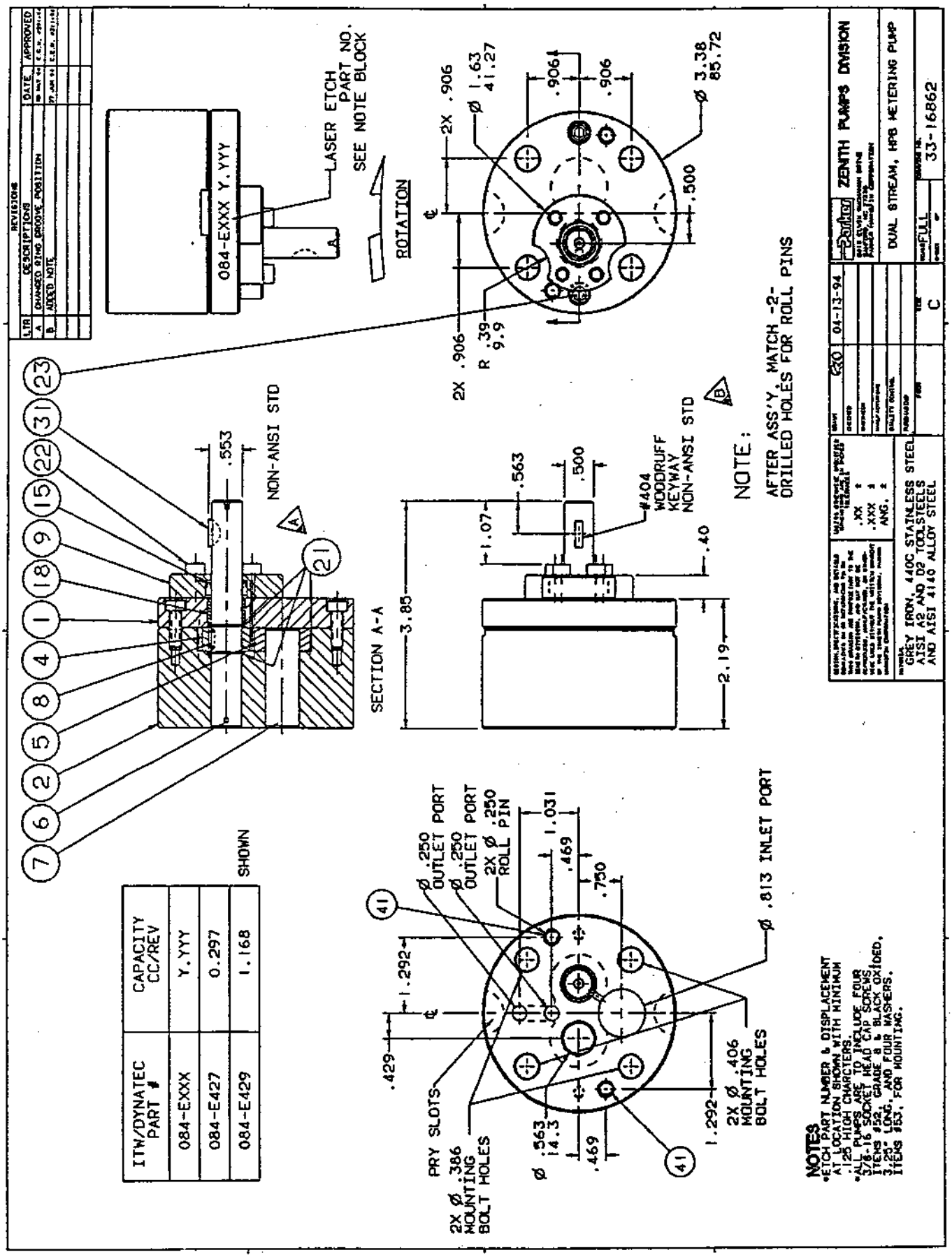
REVISIONS
LTR
DESCRIPTIONS
DATE
APPROVED
ADDED 'NOTE', ADDED 2.92 CC/REV.
ADDED DETAIL 'A'
.XX ±
.XXX ±
ANG. ±
MATERIAL
GREY IRON, 440C STAINLESS STEEL AISI A2 AND D2 TOOLSTEELS AND AISI 4140 ALLOY STEEL
04-13-94
C
SCALE: FULL
ZENITH PUMPS DIVISION
DUAL STREAM, HOB METERING PUMP
33-16852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R .39 9.9
NON-ANSI STD
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SECTION A-A
3.85
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NOTE:
AFTER ASS'Y, MATCH -2- DRILLED HOLES FOR ROLL PINS
Ø .250 OUTLET PORT
Ø .250 OUTLET PORT
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.750
Ø .813 INLET PORT
1.292
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PRY SLOTS
2X Ø .386 MOUNTING BOLT HOLES
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.469
1.292
2X Ø .406 MOUNTING BOLT HOLES
ITW/DYNATEC PART #
CAPACITY CC/REV
084-EXXX Y.YYY
084-E427 0.297
084-E429 1.168
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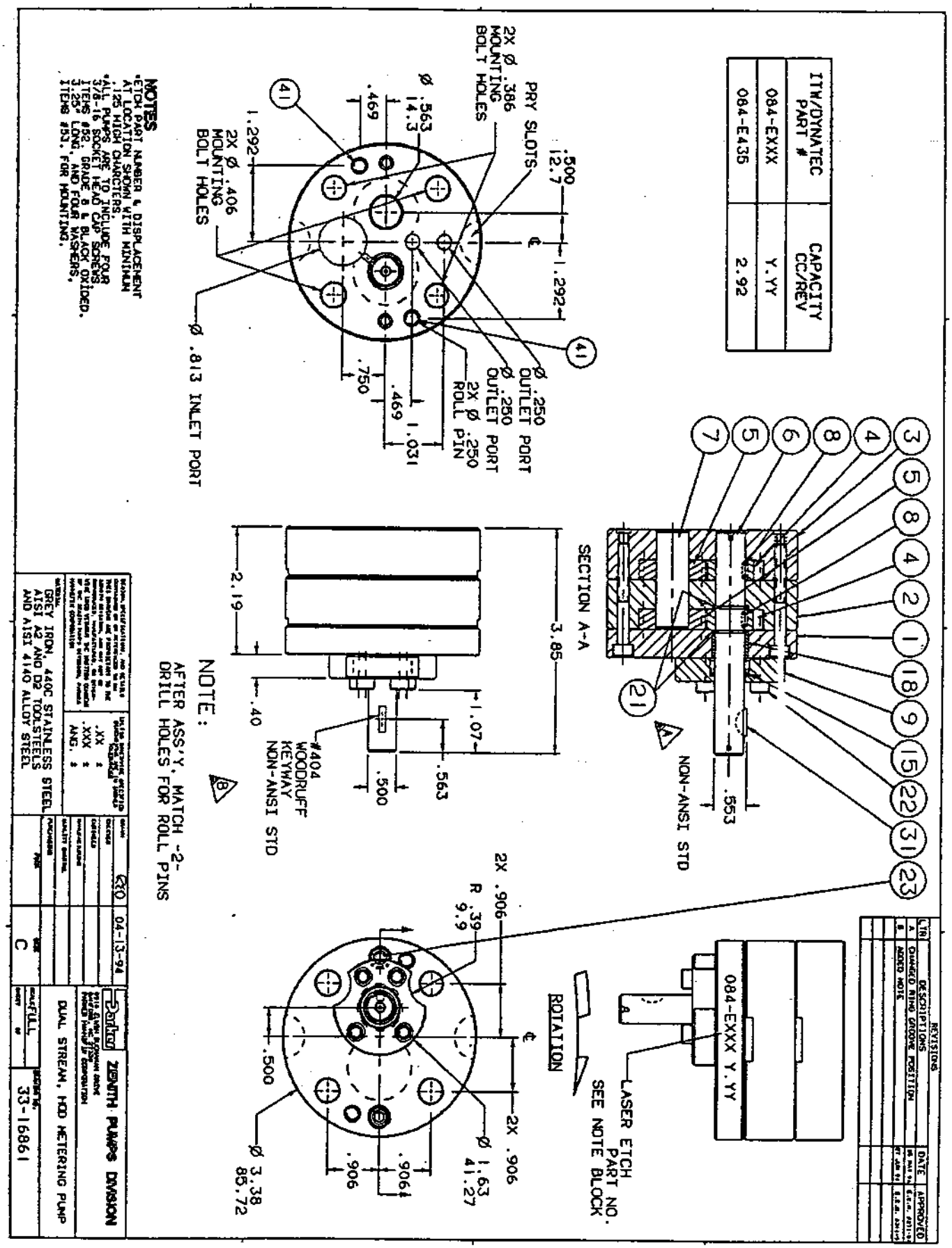
NOTES
•ETCH PART NUMBER & DISPLACEMENT AT LOCATION SHOWN WITH MINIMUM .125 HIGH CHARACTERS.
•ALL PUMPS ARE TO INCLUDE FOUR 3/8-16 SOCKET HEAD CAP SCREWS ITEMS #52, GRADE 8 & BLACK OXIDED, 3.25" LONG, AND FOUR WASHERS, ITEMS #53, FOR MOUNTING.
GREY IRON, 440C STAINLESS STEEL AISI A2 AND D2 TOOLSTEELS AND AISI 4140 ALLOY STEEL
04-13-94
ZENITH PUMPS DIVISION
DUAL STREAM, HPB METERING PUMP
FULL
C
33-16862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B
ADDED NOTE
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ALL PUMPS ARE TO INCLUDE FOUR 3/8-16 SOCKET HEAD CAP SCREWS ITEMS #52 GRADE 8 & BLACK OXIDED. 1.25" LONG, AND FOUR WASHERS, ITEMS #53. FOR MOUNTING.
PRY SLOTS
2X Ø .386 MOUNTING BOLT HOLES
2X Ø .406 MOUNTING BOLT HOLES
Ø .813 INLET PORT
Ø .250 OUTLET PORT
Ø .250 OUTLET PORT
2X Ø .250 ROLL PIN
SECTION A-A
NON-ANSI STD
#404 WOODRUFF KEYWAY NON-ANSI STD
NOTE:
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ROTATION
SEE NOTE BLOCK
LASER ETCH PART NO.
084-EXXX Y.YY
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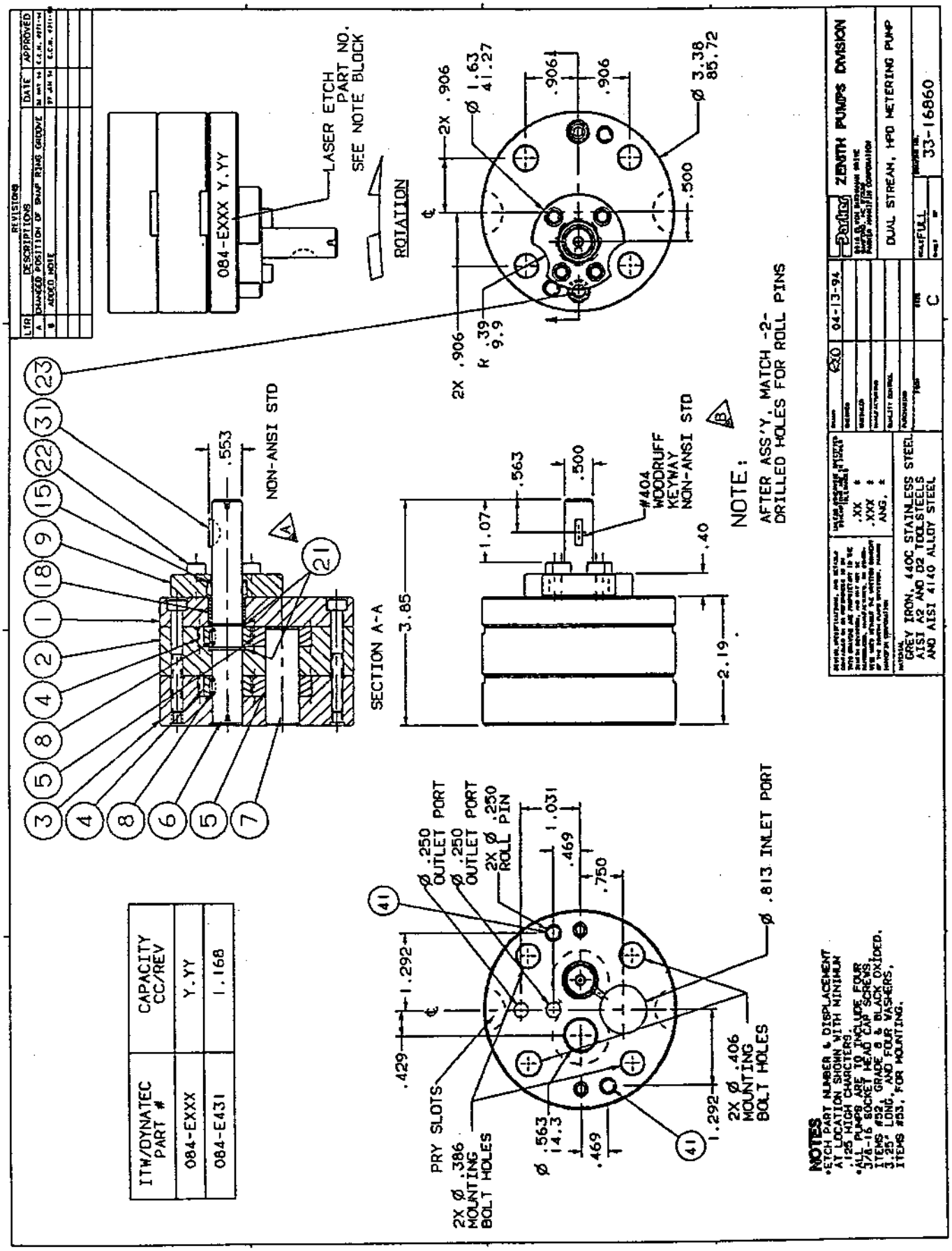
Ø 1.63 41.27
Ø 3.38 85.72
GREY IRON, 440C STAINLESS STEEL AISI A2 AND D2 TOOLSTEELS AND AISI 4140 ALLOY STEEL
04-13-94
C
DUAL STREAM, HOD METERING PUMP
ZENITH PUMPS DIVISION
33-16861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B ADDED NOTE
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Ø 3.38 85.72
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2X .906
R .39 9.9
NON-ANSI STD
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SECTION A-A
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#404 WOODRUFF KEYWAY NON-ANSI STD
1.07
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NOTE:
AFTER ASS'Y, MATCH -2- DRILLED HOLES FOR ROLL PINS
Ø .250 OUTLET PORT
Ø .250 OUTLET PORT
2X Ø .250 ROLL PIN
1.031
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PRY SLOTS
2X Ø .386 MOUNTING BOLT HOLES
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.469
1.292
2X Ø .406 MOUNTING BOLT HOLES
Ø .813 INLET PORT
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CAPACITY CC/REV
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•ALL PUMPS ARE TO INCLUDE FOUR 3/8-16 SOCKET HEAD CAP SCREWS, ITEMS #32, GRADE 8 & BLACK OXIDED, 3.25" LONG, AND FOUR WASHERS, ITEMS #33, FOR MOUNTING.
MATERIAL
GREY IRON, 440C STAINLESS STEEL
AISI A2 AND D2 TOOLSTEELS
AND AISI 4140 ALLOY STEEL
04-13-94
Parker ZENITH PUMPS DIVISION
DUAL STREAM, HPD METERING PUMP
SIZE C
33-16860

DYNATEC/ ZENITH HIGH ACCURACY GEAR PUMPS INSTALLATION, CARE & MAINTENANCE MANUAL

PN 084E428, 084E430, 084E432, 084E434, 084E436

Part Number	Material	Type/Accuracy	Output/Rev	Shaft Seal PN
084E428	Tool Steel	Single/ High	0.297cc	069X251
084E430	Tool Steel	Single/ High	1.168cc	069X251
084E432	Tool Steel	Dual/ High	1.168cc	069X251
084E434	Tool Steel	Single/ High	2.920cc	069X251
084E436	Tool Steel	Dual/ High	2.920cc	069X251

Thoroughly read and understand this entire manual before installation and operation of pump.

Note: The instructions given herein cover the description, installation, operation and maintenance of subject equipment. Dynatec and Zenith reserve the right to make engineering refinements that may not be reflected in this bulletin.

Manual revised 8/94

INTRODUCTION

In 1926, Zenith Pumps was appoached by the synthetic fiber industry to design a pump to provide a precise, pulseless, repeatable flow and assure better quality control. The options then were the same as those in the chemical process industry today: diaphragm, lobe, coarse gear, piston, plunger and screw pumps. Each had problems with pulsation, flow inaccuracies, multiple seal areas and slippage, which required constant calibration, high maintenence and extended downtimes.

Zenith Pumps met the challenge and designed a rotary external gear pump of unique precision and simplicity. Manufacturing techniques were developed to hold tolerances to .00005", and an internal pressure relief mechanism assured reliable precision metering. The pump's simple design of only three moving parts - two metering gears and a drive shaft - provided long life and easy maintenance.

For years since, chemical engineers have relied on Zenith to provide precision fluid handling solutions for their most difficult pumping applications. Zenith gear pumps can be found wherever precise, pulseless, repeatable metering of fluids is required.

BENEFITS

High Accuracy
Stable, repeatable flows are assured even under varying conditions of pressure, viscosity and temperature.

High Temperature Capability
Operating temperatures to 550 degrees F (288 degrees C).

Maximum Life
Only three moving parts; components are through-hardened tool and die steels to 62 HRc or better. Replaceable sleeve bearings for low-cost rebuilds.

High Volumetric Efficiency
Maximum efficiency is achieved with optimum operating clearances and assured under pressure by built-in alignment dowels.

Minimum Pulsation
Unique design offers virtually pulseless flow without valves or flexible elements to hinder performance.

Precision Construction
Ground and lapped components for close control of operating clearances.

SPECIFICATIONS

Pump Type: Rotary external spur gear, single stream.

Rotation: Clockwise

Operating Speed: 3 - 120 rpm depending upon application conditions and fluid viscosity.

Temperature: To 550 degrees F (288 degrees C)

DESIGN

Dynatec/ Zenith High Accuracy Metering Pumps consist of two gears rotating in mesh within a closely fitted housing that is comprised of three plates. The center gear plate fits closely around the outside diameter of the metering gears. The front and rear plates sandwich the center plate and restrict axial movement of the gears. Power is transmitted to the gears by the drive shaft which is a through shaft. Shaft sealing is accomplished with a high temperature cup seal.

High-accuracy pumps are precision instruments requiring skilled and careful maintenence. Constructed of high-quality tool and die steels such as AISI D2, M2, M4 and CPM-M4, or other high-performance alloys, they are tempered after heat treatment to hardnesses ranging from HRc 58 to HRc 64. Since the thermal expansion rates for all three steels are almost identical and are otherwise entirely compatible, it is possible to combine them so as to take advantage of their best qualities in the most economical way.

The Type D2 tool steel is often selected for the side and center plates as it offers good abrasion resistance and it is the most economical of the three steels we most commonly use. Type D2 will also provide a higher degree of corrosion resistance than M2 or M4.

The portion of the side plate subject to the most wear is the shaft bearing hole, which has an easily replaceable, inexpensive sleeve bearing that can be made of the extremely wear resistant Type M4 tool steel. Types M2 and CPM-M4 steels are commonly used for the metering gears, drive shaft and universal seal coupling, due to their superior torsional strength and abrasion resistance for these items that are the most critical to proper metering performance.

OPERATION

All Dynatec/ Zenith High Accuracy Pumps are rear ported. Fluid enters the pump through a port drilled into the rear side plate (the side opposite the drive shaft). The fluid fills the exposed gear tooth volumes and is transported around the outer diameter of the gear pocket. As the gears mesh together, the fluid is displaced in a very precise amount out through the discharge port that is drilled alongside the inlet port in the rear plate. *cont.*

Since these pumps are not self-priming, a flooded suction is usually the minimum inlet pressure required. However, when high-viscosity fluids are used, more time is required to fill the tooth volumes. As a result, the inlet pressure must be increased, or the gears must rotate at a slower speed to ensure complete volume filling and to prevent cavitation.

Dynatec/ Zenith pumps rely on the metered fluid for lubrication of internal bearing areas. The pump should never be allowed to run dry or be allowed to run with non-lubricating fluids such as water. Because of the close clearances in the bearing areas, lack of sufficient lubrication can cause pump seizure or some other catastrophic failure.

Slippage will occur across the faces of the gears from the high-pressure side to the low-pressure side. The amount of slippage depends on four factors: fluid viscoisty, speed, differential pressure and pump clearances. Under reasonably stable operating conditions, slippage is repeatable and predictable and pump operation can be adjusted to compensate.

The High Accuracy Pumps are designed for high-temperature and high-pressure operation. As such, operating temperatures to 550 degrees F can be achieved.

INSTALLATION

Pumps should be carefully unpacked to make sure that the shipment is complete. If any items are missing or damaged, the freight carrier and Dynatec should be notified immediately.

While the pump is composed of steel, it is a precision instrument. Dropping the pump or hitting with a non-yielding material can cause serious damage to the components. All materials are through-hardened to maximum hardness resulting in brittle material. Treat them as you would any other precision gauging instrument.

Dynatec/ Zenith pumps are shipped filled with a rust preventive oil. Flush the oil throughly with a cleaning solvent. It may be necessary to disassemble the seal arrangement to remove all traces of the oil, but disassemble only if necessary.

After flushing, the pump should be lubricated internally for start-up purposes. Pour a suitable high-temperature lubricant (silicone oil) into the inlet port. Rotate the metering gears until lubricant appears at the discharge port.

Mount the pump to a block with a flatness of true flat to .0001” convex and a surface finish of 4 to 8 rms to prevent leakage between the pump and block. Mounting bolts should be a Grade 8 or better. Make sure mounting bolts are lubricated with a high-temperature anti-seize compound such as DAG Dispersion #154. Bolts should be alternatively torqued in even increments up to Dynatec’s recommended limit for the bolt size used. See Table 1 on page 26 for torque values.

The following is a brief “standard” installation procedure. For any special applications, considerations or simply to ask our advice, please contact ITW Dynatec. *cont.*

TO PREPARE THE PUMP FOR USE:
1. Always flush out the plumbing system before connecting the pump.
2. Filters should be installed prior to the pump inlet that filter ideally to half the pump running clearances.
3. Turn pumps by hand before running. Pumps should turn freely.
4. Engage the outer drive shaft carefully, making sure that it does not bottom in the slot of the coupling* and that it is aligned within one degree angular and .005" parallel with the true pump drive axis. (*Note: the coupling is the rotating member of the seal and depends on the internal operating pressure of the pump to force it forward and effect a seal against the carbon or metal seal plate.)
5. Tighten the mounting bolts and coupling housing screws to Dynatec recommended torque at room temperature.
6. Make sure fluid is in the pump before starting.
7. Start pump slowly and, if possible, run it with a lubricating fluid.
8. When satisfactory operation is achieved, the pump and system may be gradually brought up to normal process speeds and pressures.
9. If at any time during operation the pump does not appear to be running smoothly, stop the pump immediately to avoid any serious internal damage.

CLEANING, INSPECTION AND REPAIR

REMEMBER: Dynatec/ Zenith metering pumps are made for exacting duty. In order to develop the high pressure demanded, the clearance between the metering gears and their housing must be as small as possible, yet large enough to allow adequate lubrication. All parts are machined to extreme accuracy; critical dimensions are held between one and two ten-thousanths of an inch (.0001"/ .0002"). Because of these close running clearances, these pumps require careful maintenence and handling, especially of component parts. The slightest burr, nick or particle of foreign matter can cause scoring or even seizure. These pumps are precision instruments; you can't keep them too clean. Please treat them with care, and if it's at all possible, set aside a separate clean area for pump maintenance.

To clean High Accuracy Metering Pumps, place them in a suitable furnace and gradually heat in an inert atmosphere for the initial hour to prevent flashing of the polymer. Time at temperature will be related to the pump size and the degree of polymer contamination and should be determined by trial. Note: Careful control of he furnace temperature (950 degrees F max.) and atmosphere is critical. Should the temperature exceed the original tempering temperature, the steel hardness will draw back and the dimensional stability of the pump may be upset.

Another acceptable cleaning method is to immerse the pump in a fluidized bed cleaning bath. The bath shold be heated to a temperature that is sufficient to carburize the polymer. The carburization process usually takes between 3 and 12 hours, depending on the polymer type, temperature, pump size and furnace load. *cont.*

CAUTION: Avoid exposing the pump to thermal shock when using this method of cleaning.

After gradually cooling to room temperature, the pump should be thoroughly flushed in a clean solvent. It may be necessary to disassemble the seal arrangement to remove polymer ash.

If present, always replace the carbon seal plate after pump burnout. If the pump was performing satisfactorily when removed from service and still turns freely after burnout, pressure test it and add a high-temperature lubricant to prepare it for return to service. To store for future use, simply add a rust preventative oil.

It is recommended that pump users institute a program of dimensional inspection of critical parts in order to keep maintenence and operting costs at a minimum. By noting the performance of a pump immediately before removing it from service and correlating the performance to measured component wear, the user can establish the maximum wear limits for the pump's critical components. Further, he can predict the service life of the pump and schedule his down-time accordingly.

As with any other Dynatec pump, high accuracy pumps may be returned to Dynatec for complete rehabilitation as necessary. This procedure may be desirable if only a few pumps are involved. If a large number of pumps are to be maintained at the user's plant, it may be worthwhile to have key personnel attend a maintenance seminar at the Zentih factory to view the manufacturing, gauging and assembly techniques involved in producting the pumps. Please contact Dynatec (at 1-800-538-9540) for further information on these items.

HIGH ACCURACY PUMP DISASSEMBLY

If pumps are to be disassembled on a regular basis, we recommend that you establish a pump room with all the necessary tools and equipment for disassembly and cleaning with a separate "clean" area for assembly, testing and storing of rebuilt pumps.

If maintenence is required due to low delivery or seizure, the following procedure is recommended for disassembly.

NOTE: Be sure to note the location and orientation of all parts to ensure correct re-assembly. Refer to assembly drawing (located in the back of this manual) for your correct pump type.

1. Remove the seal arrangement.
2. Remove all binder screws.
3. Remove dowels (10) and arbor (5) with an arbor press in the direction which disengages the press fit in the shortest distance.

NOTE: Dowels and arbors for the high accuracy pumps are press fit in the rear front plate (1) and slip fit in the center (2) and side plates (3). *cont.*

4. Separate the plates by pry slots. Great care should be taken not to scratch or damage the internal pump surface when prying the plates apart.

5. After disassembly, clean all components in a glass bead blast cabinet to remove any debris remaining after heat cleaning. Alternative, non-destructive cleaning methods such as water jet or solvents are also acceptable.

6. Wash components in an ultrasonic cleaning tank and air dry. Be careful not to bang parts together.

7. Inspect all parts for nicks, burrs, score marks and other signs of wear. The plates and faces of the gears may be hand blocked on 400/600 grit paper and any nicks, burrs or sharp edges can be lightly removed with a honing stone. Be careful not to round off the edges of the gear teeth while lapping.

CAUTION: Since the thickness relationship between the metering gears and the center plate is critical to metering performance, and the center plate is non-wearing on its sides, lapping these components is not necessary and should not be done under any circumstances.

Place a layer of 400 Grit Emery Cloth on a lapping block or plate-a granite flat is suitable. Apply light pressure to the component and turn it in a figure-8 fashion (as shown in Figure 1) approximately ten times until a smooth finish appears. Turning in a circular fashion, or other non-uniform motion, may cause the ground holes to lose their perpendicularity to the faces.

Always use clean, lint-free rags and compressed air to clean components. Paper towels are not acceptable; they may leave small pieces of paper and dust on the components. Use chemical brushes to clean between gear teeth, bores and reliefs.

8. Replace sleeve bearings as necessary and hone in the plate to the original new part specifications.

9. After each resurfacing, carefully gauge the area between the inlet and discharge ports at the mesh of the gears. This area, commonly referred to as the “throat”, is the most critical part of the plate. Scoring or wear marks here will allow increased slippage from the high-pressure discharge port section across the throat to the lower inlet port, reducing efficiency. Therefore, carefully gauge this area for flatness after each resurfacing.

10. After all components are “hospital clean”, the pump is ready for assembly.

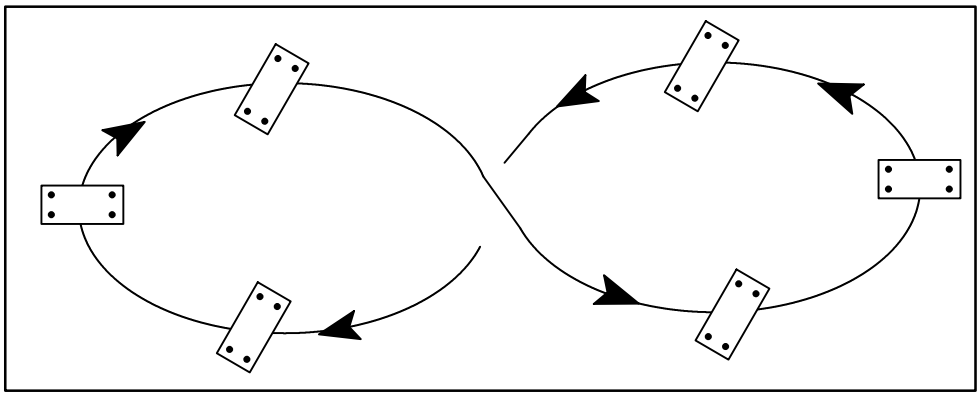


Figure 1

HIGH ACCURACY PUMP RE-ASSEMBLY

NOTE: During and between each re-assembly step, manually turn the metering gears to ensure that they are free turning. If binding occurs at any time, determine the cause and correct it immediately. A tiny nick, burr or foreign particle can extensively damage a valuable pump component. Never use force in re-assembling or turning a Dynatec pump. If properly aligned, the pieces will fit easily into place and the pump will turn freely. Re-assemble as follows:

1. After all worn parts have been re-finished or replaced, all parts should be throughly cleaned in a solvent and dried.
2. Using the driven gear (7) as an up-righting fixture, carefully locate the arbor (5) over its press-fit hole with the help of an appropriate arbor press.
3. Place the rear side plate (3) with the arbor in position in a soft-jaw vise or holding fixture.
4. Slip together the driving metering gear (6), drive shaft (4), key (8) and retaining ring. Position in the front of the side plate by installing the drive shaft through the bearing (49).
5. Place the driven metering gear on its arbor and carefully mesh with the drive metering gear.
6. Carefully lower the center plate (2) over the gears.

NOTE: Repeat steps 5 and 6 for four-gear pumps, placing the middle plate between gear plates.

7. Position the front side plate (1).
8. Rotate the gears to ensure free rotation.
9. Press the dowels (10) into place moving in the direction of the shortest press distance. (Usually from the rear side of the pump.)
10. Lubricate the binder screws (47, 48) with DAG dispersion #154 or a similar heat resistant lubricant and install. Torque the screws in even increments to the manufacturer's recommended limit. It is especially important to rotate the gears frequently during this operation.
11. Re-assemble the seal arrangement, making sure the sealing surfaces are perfectly clean and free of scratches, nicks or burrs. When a carbon seal plate is used, always use a new carbon seal that has been lightly polished on 400/600 grit paper. When using a carbon seal, the coupling housing screws (27) should be torqued to the manufacturer's recommended limit. For pumps with a compensation packing seal, be sure all old packing is removed from the packing housing.
12. Inspect the drive shaft at the seal area making sure that it is not scored, shouldered or worn. Worn shafts will result in premature seal leakage and should be replaced.
13. Pack lip seals (15) with a silicone-based grease and lubricate with Parker Super-O-Lubricate or an equivalent silicone-based oil.
14. Install lip seals into seal housing (22) as shown.
15. Tighten seal housing screws to 60 lbs./in. Check for rotation.

SCREW TORQUE VALUES (Standard Alloy Steel)*

Screw Size & Thread (UNC Alloy Steel)		**Torque (Lubricated Threads)** Lbs.-in.	Nxm	Lbs.-ft.
#10-24 (w/ carbon seal gasket)		[50]	5.7	[4.2]
#10-24 (w/o carbon seal gasket)		[64]	7.2	[5.3]
#12-24		[120]	13.6	[10]
1/4-20		[150]	16.9	[12.5]
5/16-18		[305]	33.9	[25]
3/8-16	*into aluminum*	[360]	40.6	[30]
7/16-14	*block (hopper)*	[480]	54.2	[40]

Table 1

*In critical applications where control of bolt preload is important, the torque-tension relation should be determined by experimenting on the actual parts involved (including thread lubricants). At elevated temperatures, it is often desirable to reduce screw stress because of deformation (creep) under sustained loading. Screws constructed of type H-11 high-temperature alloy steel provide extremely high creep resistance.

TROUBLESHOOTING GUIDE

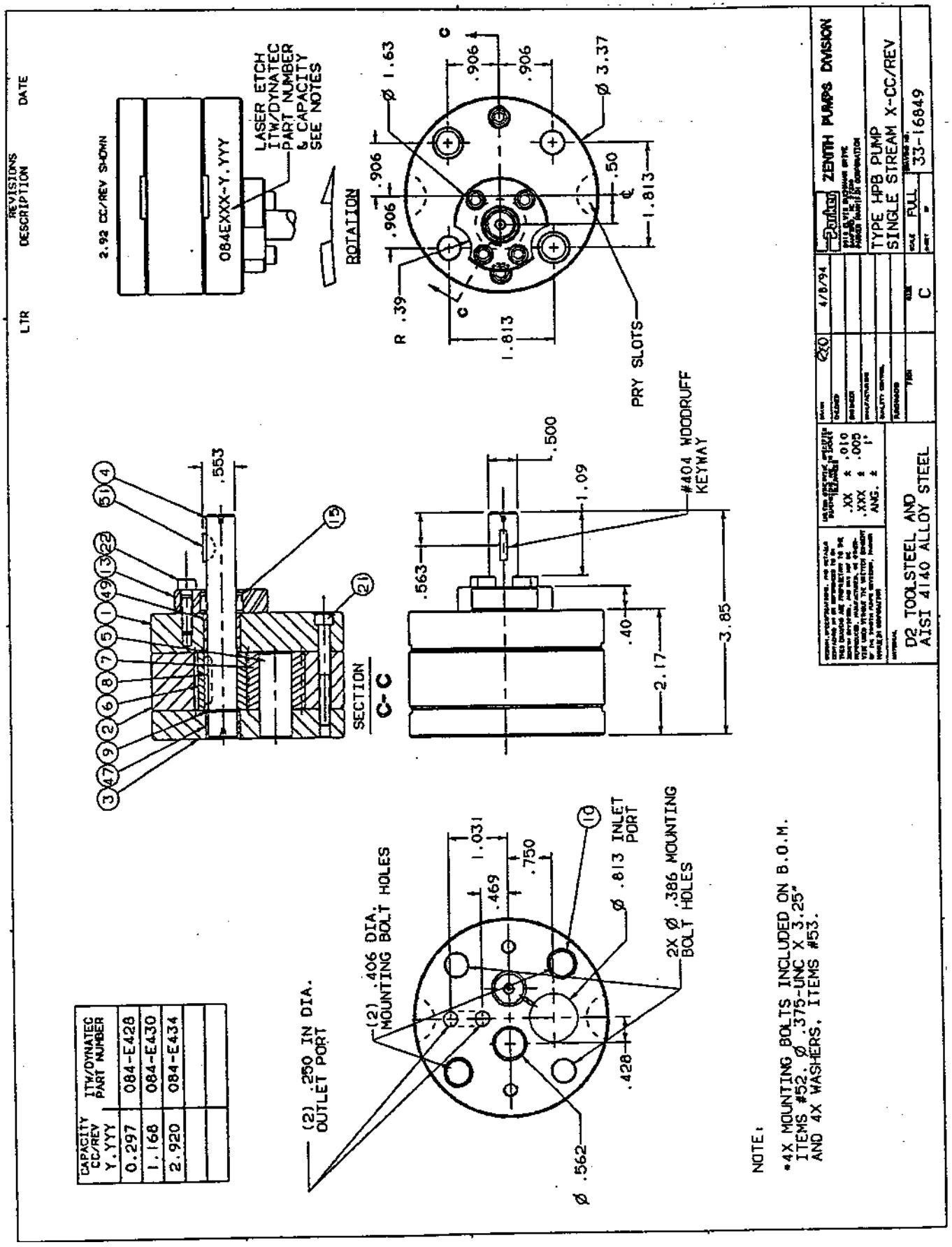
Trouble	***Probable Cause***	***Remedy***
Pump will not turn.	1. Low pump temperature.	Check temperature sensor and control loop for proper setting/ operation. Allow sufficient heat-up time.
	2. Drive malfunction.	Verify drive is powered. Check to assure all alarm circuits are clear. Check drive motor current and speed settings. Check all drive couplings.
	3. Process conditions changed.	Check process conditions for proper melt temperature, pressures, viscosities and materials.
	4. Entrained particle.	Return pump to ITW Dynatec for repair.

cont.

TROUBLESHOOTING GUIDE, ***continued***

Trouble	***Probable Cause***	***Remedy***
	5. Possible internal damages.	Return pump to ITW Dynatec for repair.
Excessive seal assembly leakage	1. Worn seal plate.	Return pump to ITW Dynatec for repair.
	2. Insufficient inlet pressure.	Increase inlet pressure.
	3. Worn lip seal.*	Replace lip seal.
Reduced pump efficiency	1. Worn gear(s).	Return pump to ITW Dynatec for repair.
	2. Worn bearings.	Return pump to ITW Dynatec for repair.
	3. Process conditions changed.	Consult factory for clearance recommended on new process conditions.

* A minor seal leak or weep is not abnormal and may be desirable for lubricating the seal surfaces.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Ø 3.37
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R .39
PRY SLOTS
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SECTION C-C
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#404 WOODRUFF KEYWAY
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2.17
3.85
(2) .250 IN DIA. OUTLET PORT
(2) .406 DIA. MOUNTING BOLT HOLES
1.031
.469
.750
Ø .813 INLET PORT
2X Ø .386 MOUNTING BOLT HOLES
.428
Ø .562
NOTE:
*4X MOUNTING BOLTS INCLUDED ON B.O.M.
ITEMS #52, Ø .375-UNC X 3.25"
AND 4X WASHERS, ITEMS #53.
CAPACITY CC/REV Y.YYY
ITW/DYNATEC PART NUMBER
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1.168 084-E430
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ZENITH PUMPS DIVISION
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SINGLE STREAM X-CC/REV
SCALE FULL
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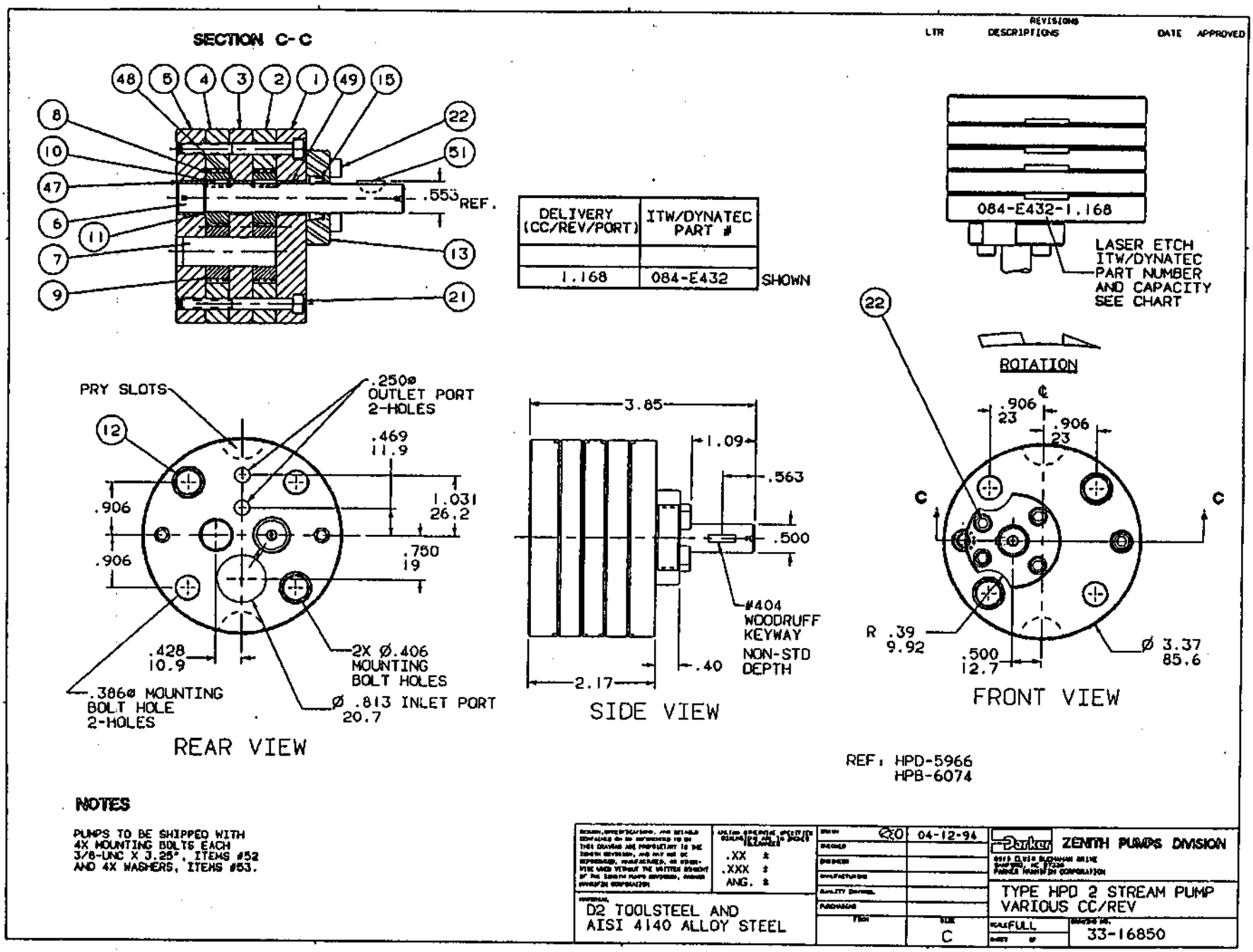
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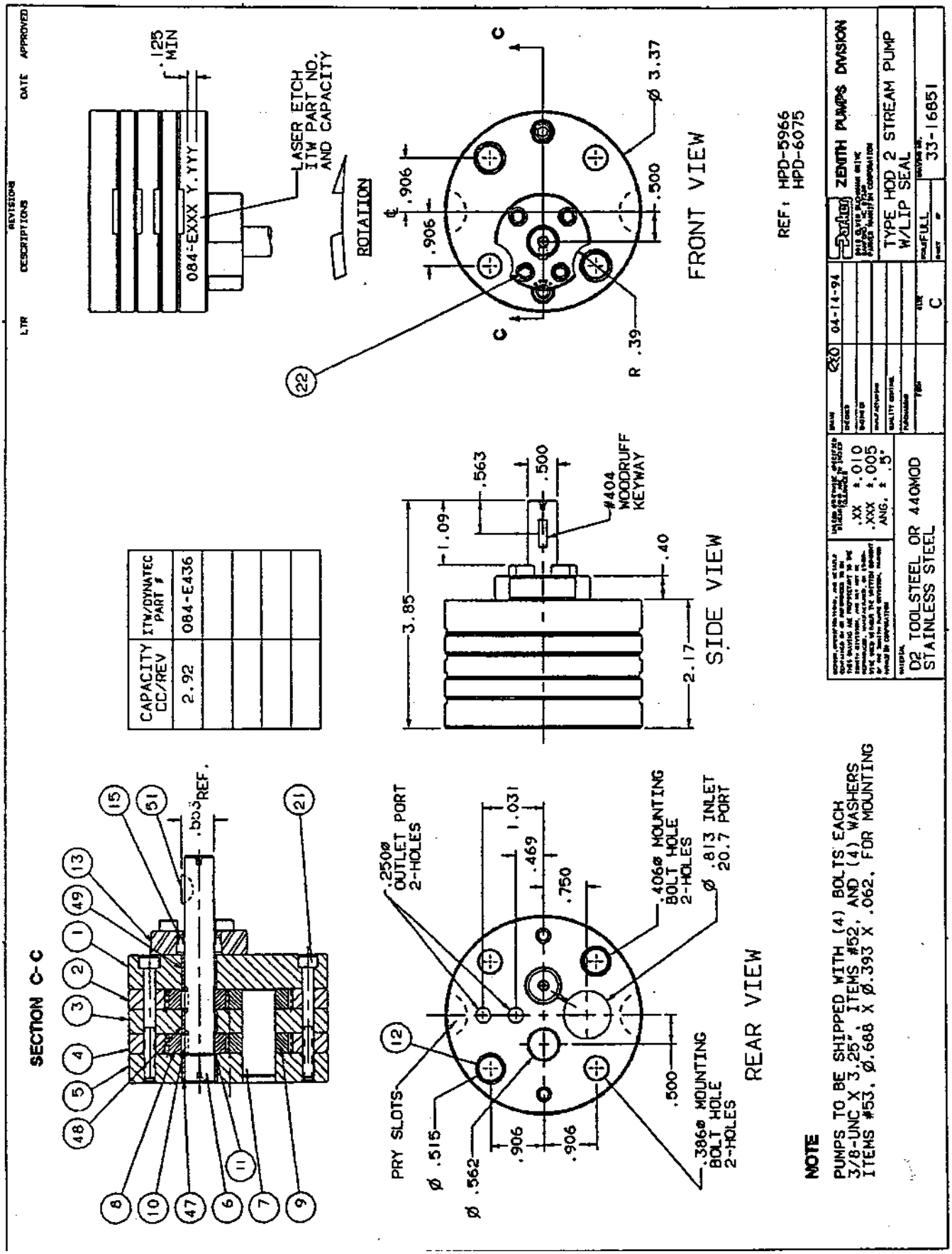
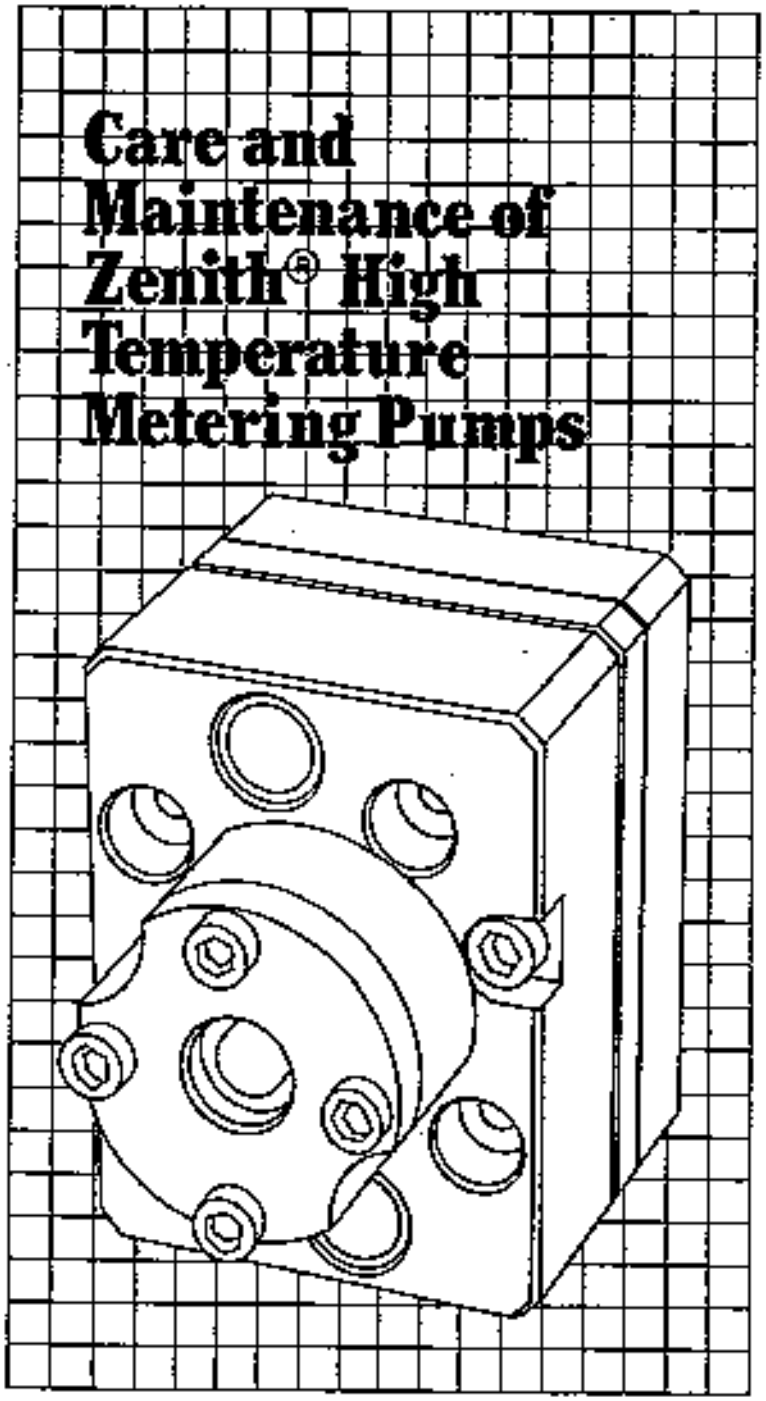
.469 11.9
1.031 26.2
.906
.906
.750 19
.428 10.9
2X Ø.406 MOUNTING BOLT HOLES
.386ø MOUNTING BOLT HOLE 2-HOLES
Ø .813 INLET PORT 20.7
REAR VIEW
3.85
1.09
.563
.500
#404 WOODRUFF KEYWAY NON-STD DEPTH
2.17
.40
SIDE VIEW
22
.906 23
.906 23
C
C
R .39 9.92
.500 12.7
Ø 3.37 85.6
FRONT VIEW
REF: HPD-5966
HPB-6074
NOTES
PUMPS TO BE SHIPPED WITH 4X MOUNTING BOLTS EACH 3/8-UNC X 3.25". ITEMS #52 AND 4X WASHERS, ITEMS #53.
.XX ±
.XXX ±
ANG. ±
D2 TOOLSTEEL AND AISI 4140 ALLOY STEEL
04-12-94
C
Parker ZENITH PUMPS DIVISION
TYPE HPD 2 STREAM PUMP VARIOUS CC/REV
SCALE FULL
33-16850


.125 MIN
084-EXXX Y.YYY
LASER ETCH ITW PART NO. AND CAPACITY
ROTATION
FRONT VIEW
Ø 3.37
.906
.906
.500
R .39
REF: HPD-5966
HPD-6075
CAPACITY CC/REV
ITW/DYNATEC PART #
2.92
084-E436
SIDE VIEW
3.85
1.09
.563
.500
#404 WOODRUFF KEYWAY
.40
2.17
SECTION C-C
.865 REF.
REAR VIEW
.250Ø OUTLET PORT 2-HOLES
1.031
.469
.750
.406Ø MOUNTING BOLT HOLE 2-HOLES
Ø .813 INLET PORT 20.7 PORT
PRY SLOTS
Ø .515
Ø .562
.906
.906
.500
.386Ø MOUNTING BOLT HOLE 2-HOLES
NOTE
PUMPS TO BE SHIPPED WITH (4) BOLTS EACH 3/8-UNC X 3.25", ITEMS #52, AND (4) WASHERS ITEMS #53, Ø.688 X Ø.393 X .062, FOR MOUNTING
D2 TOOLSTEEL OR 440MOD STAINLESS STEEL
ZENITH PUMPS DIVISION
TYPE HDD 2 STREAM PUMP W/LIP SEAL
33-16851
C

ZENITH MELT SPINNING PUMPS MANUAL

Covers ITW Dynatec part numbers:

084E374
084E376
084E387
084E388



Pump PNs 084E374 thru 084E389 use PN 069X251 pump shaft seal.
Pump PNs 084E411 thru 084E413 use PN 069X289 pump shaft seal.

This maintenance manual is as specific as possible, but please remember that there are many varieties of Zenith® pumps in service. If you have any questions about specific parts and their orientation, always refer to the drawings and parts lists for your exact pump by type. If you still have questions, refer them to us at the factory.

1. Introduction

Zenith® "Melt Spinning" Pumps are precision instruments requiring skilled and careful maintenance. Constructed of high quality tool and die steels such as AISI types D-2, M-2, and M-4, or other high performance alloys, they are tempered after heat treatment to hardnesses ranging from Rockwell "C" Scale 58 to 64. A Zenith Pump may be constructed from any one or any combination of these steels since their coefficients of thermal expansion are almost identical.

Zenith Metering Pumps consist of two or more gears housed within center and side plates. Power is transmitted to the gears by the drive shaft which is either a through shaft, as in the packing gland type of pump, or a shaft with a tang that engages a universal seal coupling. The coupling is both a connection to external power and the rotating member of a mechanical seal.

In order to develop the high pressures demanded, the clearance between the metering gears and their housing must be as small as possible, yet large enough to allow adequate lubrication. Because of these close running clearances (in many cases as low .00025"), Zenith Pumps require careful maintenance and handling, especially of component parts. The slightest burr, nick or particle of foreign matter can cause scoring or even seizure.

2. General Operating Requirements

Since Zenith Pumps depend upon metered fluids for lubrication of their internal bearing surfaces, their recommended optimum operating speed range is between 10 and 75 rpm, depending upon viscosity and operating pressures. Increasing their operating speed improves their efficiency but also provides less time to fill the gear tooth spaces.

Cavitation may occur if sufficient inlet pressure is not provided. Cavitation, or the failure to fill the tooth spaces completely, causes low delivery and excessive wear. It also encourages the introduction of air through seals. Under ideal conditions, speeds up to 200 rpm have been maintained over long periods of time. You can, however, expect accelerated wear in such instances, depending on the lubricity of the solution and the differential pressure in the application.

Another cause of low through-put is slippage across the sides of the gears from the high pressure discharge section to the lower pressure inlet section when thin fluids are metered against a substantial differential pressure. This slippage is dependent on three factors: viscosity of the material, speed of the pump and the differential pressure. Therefore, even though the clearance between the gears and their housing may be as little as .00025", high slippage may still occur from high to low pressure ports, if viscosity is low and pressure high.

3. Preparing Your Zenith Pump for Use

Assembly

Assembled with mineral oil.
Cleaned with Acetone or MEK.

Since Zenith Pumps are precise instruments, their assembly requires detailed attention to every step.

1. Zenith Pumps are shipped filled with a rust preventative oil. Flush the oil out thoroughly with a cleaning solvent. It may be necessary to disassemble the seal arrangement to remove all traces of the oil, but disassemble only if necessary.
2. After flushing, the pump should be lubricated internally. Pour a suitable high temperature lubricant into the inlet port. Rotate the metering gears until the lubricant appears at the discharge port.
3. Mount the pump to a block with a flatness of true flat to .0001" convex and a surface finish of 4 to 8 rms to prevent leakage between the pump and the block. Make sure mounting bolts are lubricated (with DAG Dispersion #154, for example) and alternately torqued in even increments up to the manufacturer's recommended limit for the bolt size used (see Table).

Screw Torque Values* (Standard Alloy Steel)

Screw Size & Thread (UNC)		Torque (lb-in.) (Lubricated threads)
#10-24	(w/ Carbon Seal Gasket)	50
#10-24	(w/o Carbon Seal Gasket)	80
#12-24	.....	120
1/4-20	.....	160
5/16-18	.....	325
3/8-16	.....	360
1/2-13	.....	900

*In critical applications where control of bolt preload is important, the torque-tension relation should be determined by experimenting on the actual parts involved (including thread lubricants). At elevated temperatures, it is often desirable to reduce screw stress because of deformation (creep) under sustained loading. Screws constructed to type H-11 high temperature alloy steel provide extremely high creep resistance.

4. Heat the pump thoroughly and evenly (including the seal arrangement).
5. Tighten the mounting bolts and coupling housing screws to the manufacturer's recommended torque at that operating temperature. If your pump has a packing seal, take up firmly and evenly on the seal gland screws to compress the packing, then back off ½ turn of the screws. Be sure to adjust the gland properly. Do not overtighten. Adjustment may be made during operation to control excessive leakage.
   - Time Saving Heating Alternative: Maintain the clean and ready-to-use pump in an oven at operating temperature. This avoids thermal shock and saves valuable heating time.

4. Startup

1. Ensure that the pump is free turning and lubricated. Engage the outer drive shaft carefully, making sure that it

does not bottom in the slot of the coupling,* and that it is aligned within 1° angular and .005" parallel with the true pump drive axis.

*The coupling is the rotating member of the seal and depends on the internal operating pressure of the pump to force it forward and affect a seal against the carbon or metal seal plate.

- In pumps with a through shaft and compression packing seal, the pump to driver axis may shift unevenly due to pump heating expansion. To remedy this, we recommend connecting the pump driver to the pump shaft with a double universal joint arrangement. This type of joint will prevent bending loads from being transmitted to the pump shaft when misaligned. This greatly reduces the possibility of premature shaft failure due to fatigue. To prevent seizure, be sure to apply adequate high temperature lubrication to the universal joints.

2. After startup, take up gradually and evenly on the packing gland screws until slight weepage occurs.
3. Be sure to follow up closely throughout the running-in period of the packing until the seal is thoroughly seated. Do not completely seat the packing in one adjustment.

5. Cleaning

1. To clean melt spinning pumps, place them in a suitable furnace and gradually heat in an inert atmosphere for the initial hour to prevent flashing of the polymer. Time at temperature will be related to pump size and degree of polymer contamination and should be determined by trial.

   NOTE: Careful control of the furnace temperature and atmosphere is critical. Should the temperature exceed the original tempering temperature, the steel hardness may draw back and the dimensional stability of the pump may be upset. Consult Table for proper tempering temperature.

AISI Type	Tempered At	Rockwell C Hardness
D-2 (Ohio Air Die)	950°F (510°C)	58-60
M-2	1050°F (566°C)	61-64
M-4 (Neatro)	1050°F (566°C)	61-64

   - Another acceptable cleaning method is to immerse the pump in a fluidized bed cleaning bath. The bath should be heated to a temperature that is sufficient to carburize the polymer. The carburization process usually takes between 3-12 hours, depending on the polymer type, temperature, pump size and furnace load.

     CAUTION: Avoid exposing the pump to thermal shock when using this method of cleaning.

2. After gradually cooling to room temperature, the pump should be thoroughly flushed in a clean solvent. Again, it is usually necessary to disassemble only the seal arrangement to remove polymer ash.
3. Always replace the carbon seal plate after pump burnout. If the pump was performing satisfactorily when removed from service and still turns freely after burnout, pressure test it and add a high temperature lubricant to prepare it for return to service.

   - To store for future use, simply add a rust preventative oil.

6. Disassembly

If pumps are to be disassembled on a regular basis, we recommend that you establish a pump room with all the necessary tools and equipment for disassembly and cleaning with a separate "clean" area for assembly, testing and storing of rebuilt pumps.

If maintenance is required due to low delivery or seizure, the following procedure is recommended for disassembly.

NOTE: Be sure to note the location and orientation of all parts to ensure correct reassembly.

1. Remove the seal arrangement.
2. Remove all binder screws.
3. Remove dowels and arbors with an arbor press in the direction which disengages the press fit in the shortest distance.

   NOTE: Most dowels and arbors are press fit in the front side plate and slip fit in the center and rear side plates. When this is the case, it is preferable to press from the front (drive) side. Separate the plates by lightly tapping them with a soft head hammer. If pry slots are available in the pump, you may use them instead of, or in conjunction with, the above method. In either case, great care should be taken not to scratch or damage the internal pump surface when prying the plates apart.
4. After disassembly, clean all components in a glass bead blast cabinet to remove any debris remaining after heat cleaning.
5. Wash components in an ultrasonic cleaning tank and air dry.
6. Inspect all parts for nicks, burrs, score marks and other signs of wear.
   - The plates and sides of the gears may be hand blocked on 400/600 grit paper and any nicks, burrs or sharp edges can be lightly removed with an Arkansas stone.

     CAUTION: Since the thickness relationship between the metering gears and center plate is critical to metering performance, and the center plate is non-wearing on its sides, lapping these components is not necessary and should not be done under any circumstances.
7. To keep maintenance costs to a minimum, the following procedure is recommended.
   A. Measure used parts and compare their dimensions with new part standards. This will provide you with precise information on the wear of the pump parts and aid in maximizing the useful life of each component.
   B. Replace worn gears, shafts, bearings and center plates.
   C. Side and middle plates may be refinished by grinding and/or lapping them to remove wear markings and return them to flatness within .0001" convex and a surface finish of 4 to 8 rms.
8. Replace the sleeve bearings as necessary and bone in the plate to the original new part specifications.
9. After each resurfacing, carefully gauge the area between the inlet and discharge ports at the mesh of the gears. This area commonly referred to as the "throat" is the most critical part of the plate. Scoring or wear marks here will allow increased slippage from the high pressure discharge port section across the throat to the lower inlet port reducing efficiency. Therefore, carefully gauge this area for flatness after each resurfacing.

7. Reassembly

NOTE: During and between each reassembly step, manually turn the metering gears to ensure that they are free turning. If binding occurs at any time, determine the cause and correct it immediately. A tiny nick, burr or foreign particle can extensively damage a valuable pump component. Never use force in reassembling or turning a Zenith Pump. If properly aligned, the pieces will fit easily into place and the pump will turn freely.

Reassemble the pump as follows:

1. After all worn parts have been refinished or replaced, all parts should be thoroughly cleaned in a solvent and dried.
2. Using the driven gear as an uprighting fixture, carefully locate the arbor over its press fit hole in either the front or rear plate. Smoothly drive the arbor into its hole with the help of an appropriate arbor press.
3. Place the front side plate with the arbor in position in a soft-jaw vise or holding fixture.
4. Slip together the driving metering gear, drive shaft and key. Position in the front of the side plate by installing the drive shaft through the bearing.
5. Place the driven metering gear on its arbor and carefully mesh with the driving metering gear.
6. Carefully lower the center plate over the gears.
7. Position the rear side plate.
8. Rotate the gears to ensure free rotation.
9. Press the dowels into place moving in the direction of the shortest press distance. (Usually from the rear side of the pump.)
10. Lubricate the binder screws with DAG Dispersion #154 or a similar heat resistant lubricant and install. Torque the screws in even increments to the manufacturer's recommended limit. It is especially important to rotate the gears frequently during this operation.
11. Reassemble the seal arrangement, making sure the sealing surfaces are perfectly clean and free of scratches, nicks or burrs. When a carbon seal plate is used, always use a new carbon seal that has been lightly polished on 400/600 grit paper. When using a carbon seal, the coupling housing screws should be torqued to ½ the manufacturer's recommended torque limit.

    For pumps equipped with a compression packing seal, be sure all old packing is removed from the packing housing.
12. Inspect the drive shaft at the seal area making sure that it is not scored, shouldered or worn.
13. Dip the packing rings into high temperature oil and graphite. This aids in assembly and running-in of the packing.
14. Place the first packing over the shaft and force it firmly and evenly to the bottom of the packing housing. Tap it firmly into place.
15. Rotate the drive shaft by hand after each ring is installed to aid in seating the packing. Continue to install the rings in this manner until the proper number of packings have been installed.
16. Firmly compress the packing by alternating and evenly tightening up the gland screws, then back off ½ turn. Be sure to adjust the gland evenly.

8. Some Causes of Pump Failure

Problem	Cause
Seizure	a) foreign particle b) mounting block not flat c) uneven heating d) lack of lubrication e) interference fit of moving parts
Excessive Slippage (reduced pump efficiency)	a) worn gears: thickness and outside (reduced diameter, corners of teeth not square) b) worn center plate c) side plates scored at throat d) side plates not flat
Seal Leakage*	a) worn or scratched coupling or seal plate b) drive shaft bottoming in slot of coupling c) drive shaft misaligned

* A minor seal leak or weep is not abnormal and may be desirable for lubricating the seal surfaces.

9. Rehabilitation

Pumps may be returned to an authorized repair facility for rehabilitation. All repaired pumps must pass the same strict standards as new ones.

10. Factory Visit

If pumps are to be maintained at your plant, it can be very worthwhile to have key maintenance people spend a day at the Zenith factory to view manufacturing, gauging, and assembly techniques. Please contact us concerning plans for such a visit or with any questions you may have regarding the application or maintenance of your Zenith® "Melt Spinning" Pumps.

Parker Hannifin Corporation
Zenith Division
48 Woerd Avenue, Box 9115
Waltham, MA 02254
617/894-0650 Telex: 283905

Parker Nichols

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ITW Dynatec
An Illinois Tool Works Company

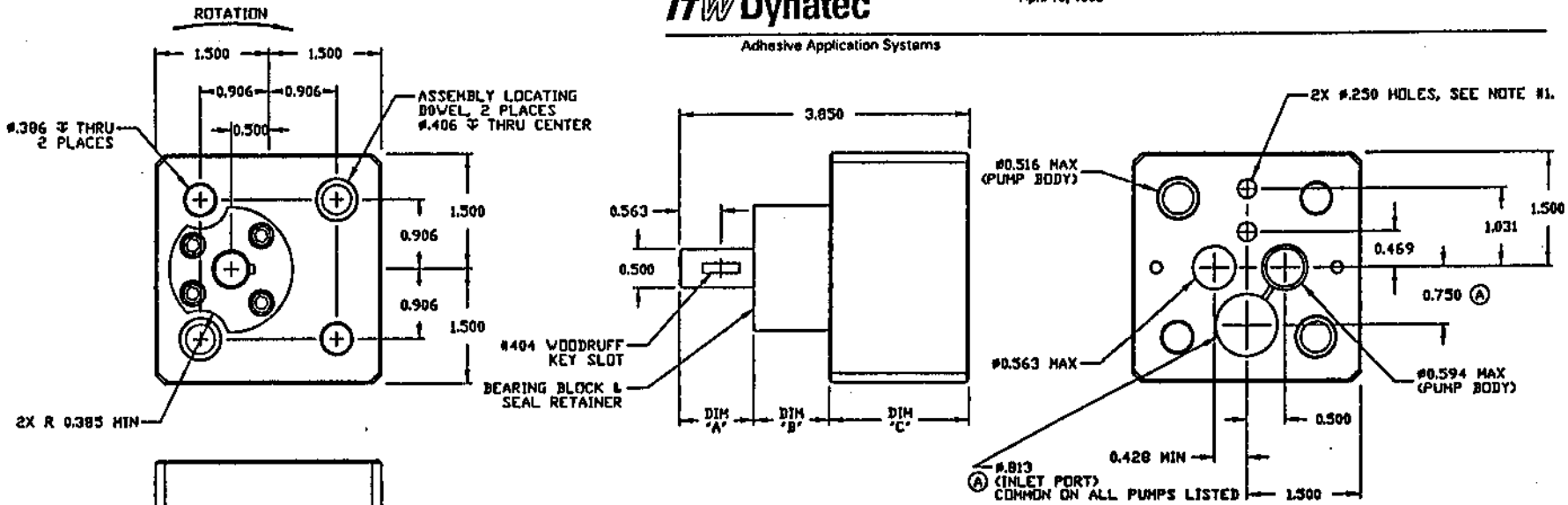
ITW Dynatec

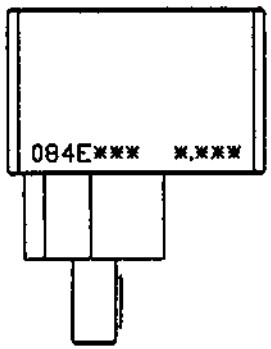
Adhesive Application Systems

ZENITH PUMPS CROSS REFERENCE CHART

PN's 084E372, 084E373, 084E374, 084E375, 084E376, 084E377, 084E387, 084E388, 084E389, 084E398, 084E399 & 084E400

April 15, 1993





DYNATEC PART #	DISPLACEMENT EACH GEAR SET	TYPE PUMP (# GEARS)	DIM 'A'	DIM 'B'	DIM 'C'	MTG. BOLT PART #	MTG. BOLT SIZE (FOUR REQ'D)	ADAPTER ASY. MDL 522 DOWN	ADAPTER ASY. MDL 622 UP	ADAPTER ASY. MDL 622SD'S UP	ADAPTER ASY. MDL 522DHE
084E372	0.160 CC/REV	SINGLE (2)	1.250	1.000	1.600	078A536	3/8-16 X 2 5/8	084E405 *	084E379	084E404	084E406
084E373	0.297 CC/REV	SINGLE (2)	1.250	1.000	1.600	078A536	3/8-16 X 2 5/8	084E405 *	084E379	084E404	084E406
084E374	0.584 CC/REV	SINGLE (2)	1.250	1.000	1.600	078A536	3/8-16 X 2 5/8	084E405 *	084E379	084E404	084E406
084E375	1.168 CC/REV	SINGLE (2)	1.250	1.000	1.600	078A536	3/8-16 X 2 5/8	084E405 *	084E379	084E404	084E406
084E376	1.752 CC/REV	SINGLE (2)	1.250	1.000	1.600	078A536	3/8-16 X 2 5/8	084E405 *	084E379	084E404	084E406
084E377	2.920 CC/REV	SINGLE (2)	1.250	.600	2.000	078A060	3/8-16 X 3	084E405 *	084E379	084E404	084E406
084E387	0.160 CC/REV	DUAL (4)	1.055	1.000	1.795	078A158	3/8-16 X 2 3/4	084E405	084E379	084E404	084E406
084E388	0.297 CC/REV	DUAL (4)	1.055	1.000	1.795	078A158	3/8-16 X 2 3/4	084E405	084E379	084E404	084E406
084E389	0.584 CC/REV	DUAL (4)	1.055	1.000	1.795	078A158	3/8-16 X 2 3/4	084E405	084E379	084E404	084E406
084E398	1.168 CC/REV	DUAL (4)	1.062	.600	2.188	078A166	3/8-16 X 3 1/4	084E405	084E379	084E404	084E406
084E399	1.752 CC/REV	DUAL (4)	1.042	1.000	1.808	078A158	3/8-16 X 2 3/4	084E405	084E379	084E404	084E406
084E400	2.920 CC/REV	DUAL (4)	1.168	.600	2.082	078A584	3/8-16 X 3 1/8	084E405	084E379	084E404	084E406

"" 084E380 ADAPTER ASSEMBLY CAN BE USED WITH SINGLE PUMPS ON MDL 522 DOWN.

NOTES:

1. THE TWO Ø.250 HOLES CONNECT INTERNALLY ON SINGLE (TWO GEAR) PUMPS. THESE HOLES ARE SEGREGATED OUTLETS ON DUAL (FOUR GEAR PUMPS).
2. ETCH PART NUMBER & DISPLACEMENT AT LOCATION SHOWN WITH MINIMUM .125 HIGH CHARACTERS.
3. ALL PUMPS ARE TO INCLUDE FOUR 3/8-16 SOCKET HEAD CAP SCREWS, GRADE 8 & BLACK OXIDED, OF THE APPROPRIATE LENGTH SHOWN ON CHART.

REV. NO.	NO. E.C.O.	MADE BY / CHKD.	DATE	REVISIONS
A		LR	10-02-92	.750 WAS .688 .813 WAS .625

085E023

ITW Dynatec
Adhesive Application Systems
910 TAYLOR INDUSTRIAL BLVD.
HENDERSONVILLE, TENNESSEE 37075
TELEPHONE AREA 615 824-3634

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UNSPECIFIED TOLERANCES: DECIMAL ± ANGLE ±
DO NOT SCALE, WORK TO DIMENSIONS ONLY SCALE: FULL

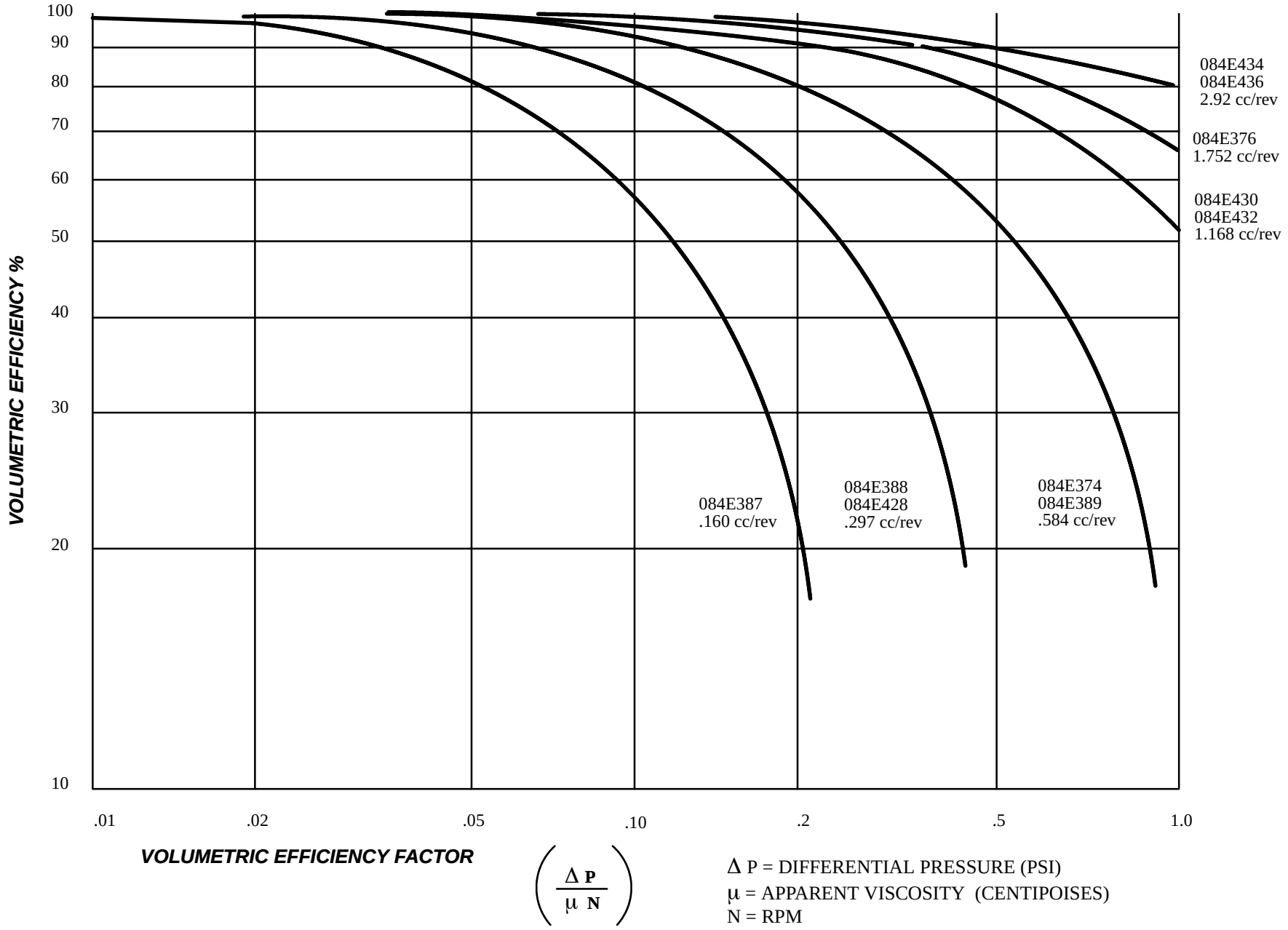
MATERIAL	TREATMENT	FINISH
D2	RC 55-60	

DRAWN BY	CHECKED BY	DATE	PART USED ON	SHEET
L. RIGGAN		09-25-92		1 OF 1

DESCRIPTION: DIMENSIONAL LAYOUT 0.160 THRU 2.920 ZENITH-DYNATEC SINGLE & DUAL PUMPS

PART IDENTIFYING NUMBER: 085EC023 REV. A

HIGH ACCURANCY PUMP PERFORMANCE



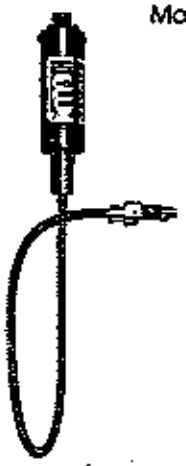
$$\left(\frac{\Delta P}{\mu N}\right)$$

Δ P = DIFFERENTIAL PRESSURE (PSI)
μ = APPARENT VISCOSITY (CENTIPOISES)
N = RPM

Pressure Transducer PN 800225 (Model 0101-1.5T-1.5/18)

INSTRUCTION MANUAL

Models 0100, 0101, 0102, 0103
Models 0110, 0111, 0112, 0113
Models 0120, 0121, 0122, 0123



As with any type of electronic or mechanical instrument, the ISI Melt Pressure Transducer will perform as required if proper attention is given to proven and well established handling, installation and operational procedures. Checklists are provided and, when followed, will ensure that the transducer will provide the service and performance that is expected of this type of instrument.

Calibration Certificate

Range: 0-1,500 PSI

Real: 1,200 PSI

Zero Balance: 0.5% full scale

Full Scale Sensitivity: 3.320 mv/v

Excitation Voltage: 10 volts recommended
12 volts maximum

INDUSTRIAL SENSORS INCORPORATED
8 Lowell Avenue, Winchester, MA 01890
Telephone: 617-729-5249
Fax: 617-729-1639

Electrical Checklist

ITEM	PROCEDURE
Wiring	As shown
Cable Connection	Use six wire-shielded cables as provided by ISI or equivalent
Calibration	With the extruder at operating temperature and no pressure applied to the transducer: • Adjust the zero control until readout is zero • Push the calibration button and adjust span (gain) until readout is at 80% of full range.

Mechanical Mounting Checklist

ITEM	PROCEDURE
Protective Cap on Sensing Diaphragm	Remove only when ready to install transducer
Machined Hole (Extruder)	Should be as shown
Transducer Preparation	Lubricate threads with Never-Seez by Bostik or C5A by Felpro
Transducer Housing	Locate in less than 160°ambient temp.
Transducer Installation	Clear mounting hole of plastic residue
Mounting Torque	150 inch pounds recommended 500 inch pounds (max)

cont.

Start-up and Removal Checklist

ITEM	PROCEDURE
Start-Up	Make sure that the extruder is at the desired temperature before the extruder drive is operated.
Removal of Transducer	Always remove the transducer prior to cleaning the extruder barrel and remove only while the extruder is at temperature.
Cleaning of Transducer Tip	Wipe the transducer tip with a cloth while the transducer is still hot. Do not use sharp tools on tip.

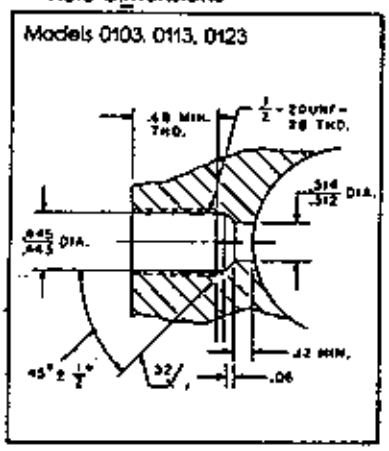
Trouble-Shooting Guide

SYMPTOM	TYPICAL CAUSE
Indicator at Full Scale or Unstable Indication	An open circuit — Perform continuity checks with ohm meter.
Indicator at zero but use of calibration procedure produces no change in reading	Faulty instrument — Replace and repair or return to ISI
Indicator responds to calibration procedure but does not indicate pressure	Transducer is damaged — Return to ISI

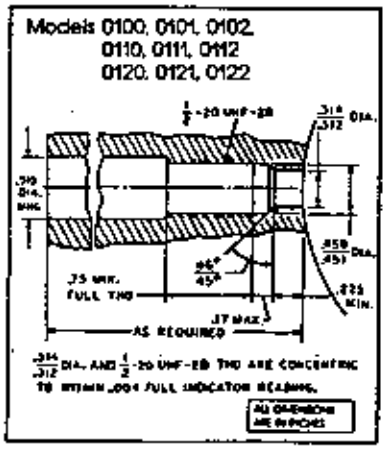
Installation –

Recommended mounting hole dimensions

Models 0103, 0113, 0123

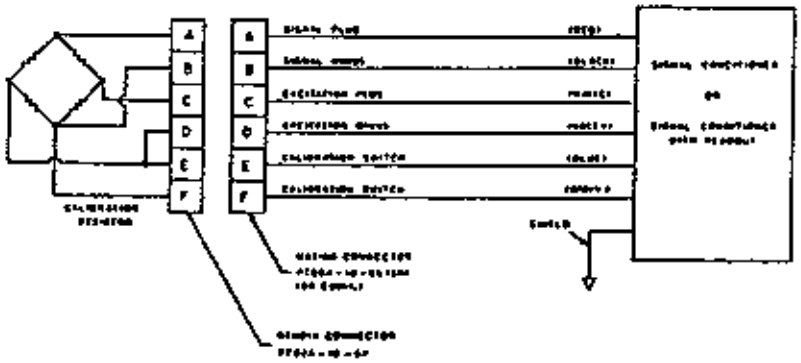


Models 0100, 0101, 0102, 0110, 0111, 0112, 0120, 0121, 0122

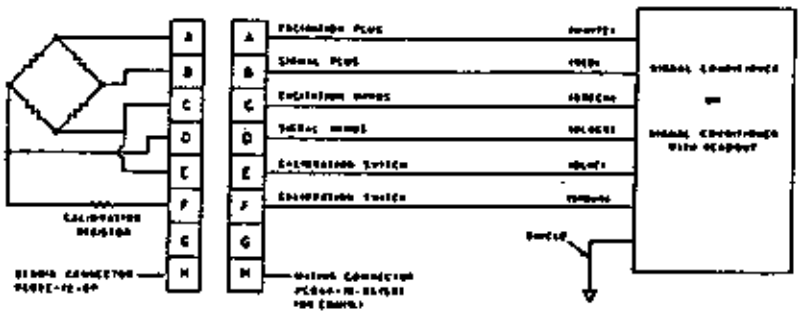


Wiring Diagrams

Models 0100, 0101, 0102, 0103
0110, 0111, 0112, 0113



Models 0120, 0121, 0122, 0123



PN 105729 Electric Clutch

Important

Please read these instructions carefully before installing, operating, or servicing your Stearns clutch, brake or clutch-brake. Failure to comply with these instructions could cause injury to personnel and/or damage to property if the brake is installed or operated incorrectly. For definition of limited warranty/liability, contact Rexnord Corporation, Stearns Division, 120 North Broadway, Milwaukee, Wisconsin 53202, (414) 272-1100.

Caution

1. Servicing shall be in compliance with applicable local safety codes including Occupational Safety and Health Act (OSHA). All wiring and electrical connections must comply with the National Electric Code (NEC) and local electric codes in effect.
2. To prevent an electrical hazard, disconnect power source before working on the clutch, brake or clutch-brake. If power disconnect point is out of sight, lock disconnect in the off position and tag to prevent accidental application of power.
3. Be careful when touching the exterior of an operating unit. Allow sufficient time to cool before disassembly. Surface may be hot enough to be painful or cause injury.

General Description

The CCC-Clutch, Clutch Couplings are designed to be assembled on adjacent shafts. It transmits rotational motion when energized by coupling these shafts together.

Through an electromagnetic force, the drive hub will attract the armature and the driving torque developed between these components effectively couples the shafts together. This torque or power flow is developed whether the driving force is on the driven hub or on the drive hub assembly. Our standard terms are used to help identify the parts for descriptive purposes only.

Installation

The magnet and rotor assembly are mounted on one shaft, normally the drive shaft. Be certain that the key is in place in the keyway and push the assembly on the shaft until the end of the shaft is flush or nearly flush with the counter bore in the rotor face. Do not have shaft extend beyond the counter bore in the rotor face. The splined driven hub with armature is mounted on the adjacent shaft. Maintain the air gap per Table A between the rotor and armature (open magnet – armature gap). Proper positioning can be checked by this air gap with the coil de-energized. Setting the initial starting gap near .010" will provide for slightly longer life from the clutch with spring release.

Fasten restraining bracket in a manner that prevents the magnet body from rotating. **Caution!** Do not overtighten the bracket, as this preloads the bearing.

Electrical Connection(s)

The voltage to be applied is determined by the rating shown on the nameplate.

A common way to provide control voltage for a unit is to use a full wave rectifier control. Connection diagrams provided with these rectifiers will depict the proper electrical connections. Due to technical advances in electronics, many rectifier controls with a 115 VAC, 60 Hz input are able to deliver an output of approximately 103 VDC when connected to a coil. This is not harmful to a 90-100 VDC rated coil in a clutch or brake.

For Stearns Tor-ac® units, the leads provided by the Tor-ac module should be connected to a fused relay or switching control source of 105 to 125 VAC, 50-60 Hz. See Figure B for a typical wiring connection of Tor-ac controlled units.

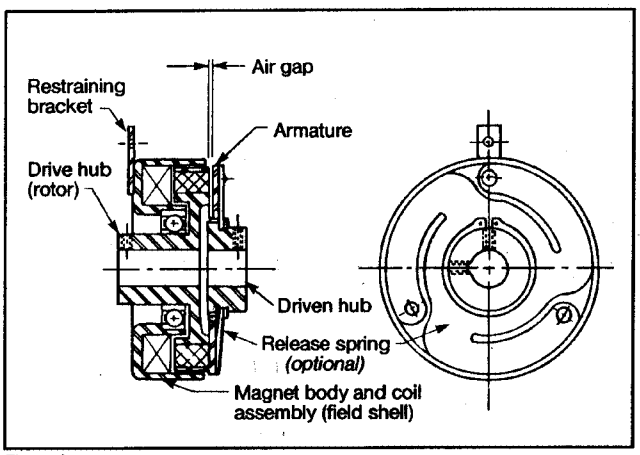


Figure A

Table A

Size	Hub-Rotor Gap (reference) (inches)	Open Magnet-Armature Gap (inches)	Maximum Allowed Misalignment (inches)	
			Parallel	Angular
3	1/32	.010 to .030	.005	.003
3.5	1/16	.010 to .030	.005	.003
5	3/32	.010 to .030	.005	.003
5.5	1/16	.010 to .030	.005	.003
8	1/8	.010 to .030	.005	.003

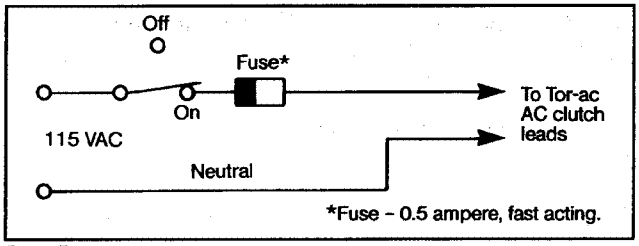


Figure B

On units with cord grips do not remove cap or turn hex portion of fitting. Wires may be twisted and torn off it attempted.

Enclosure

Normally, the machine housing provides sufficient enclosure. Care must be taken to protect unit from grease, oil or airborne materials. Slippage and excess heating of the unit may result if proper protection is not provided.

Care should be taken that high ambient temperatures do not exist. Provide proper ventilation and cooling.

Burnishing

Full torque of a new unit will not develop until the mating friction surfaces have been burnished or *run-in.* Burnishing can be accomplished by cycling the clutch-brake under normal operating conditions. Burnishing may also be accomplished by slipping under load at reduced voltage for short periods of time. Consult factory for additional burnishing instructions. If normal cycling does not provide for sufficient burnishing in your application, be prepared to discuss specifics, such as, horsepower, rpm, position and environment when talking to factory personnel.

Component Descriptions

After proper installation, no further adjustment should be required for the life of the unit.

cont.

PN 105729 Electric Clutch

Rotor or drive hub
The rotor is constructed to be mounted and keyed to a rotating shaft and held in place with set screws or other means of fastening. An outer pole and inner pole are separated by friction material. A ball bearing is mounted on the rotor shaft for the purpose of providing support to the magnet and maintaining proper air gaps on this assembly.

Driven hub
The driven hub is to be mounted to a separate shaft. It is to be keyed and held in place with set screws or other means of fastening. A spline on the outside diameter of this hub on which the clutch armature is to be assembled. A retaining ring is normally placed on the hub to act as a stop for the armature to prevent an excessive air gap between the armature and rotor face.

Armature
The armature has splines on its inside diameter which mate with splines on the driven hub. The armature is spaced on the driven hub so it can move laterally on the splines between the retaining ring stop and the face of the drive hub or rotor.

Rotor and armature faces
Normally, the wear rate will be the same on both surfaces. It is recommended that both elements be changed at the same time. Due to the metal-to-metal contact of rotor and armature, grooves will occur in armature face during normal service life.

Repairs
When the wear between the armature and friction face of the rotor exceeds 3/32", or at the time the clutch fails to engage, the following parts are to be replaced:

Armature
Rotor assembly

Other parts which are to be replaced when they become worn or malfunction:

Ball bearings
Magnet and coil assembly
Splined driven hub

Troubleshooting for Industrial Type Clutches

Note: If DC voltage is measured without the coil being connected, a misleadingly high reading results due to a capacitor in the arc suppression network used with the rectifier.

A. Overheating, coil burned-out or loss of torque

1. Check ambient temperature. Is it above 40°C? Consult factory for assistance.
2. Check thermal capacity of unit versus actual heat dissipation requirements. See Catalog 500 for specifications.
3. Check voltage supply as close to coil as feasible. Compare to nameplate data, if incorrect apply proper voltage.

   For Tor-ac units, check voltage supply as close to the Tor-ac module as possible. If this value is not between 105-125 VAC (if variable voltage input is not being used), correct the voltage source and replace burnt-out parts.
4. Is coil resistance correct? Resistance of the 90 VDC coils and Tor-ac coils are tabulated in Table B. For others, contact factory.

Table B

Size/Style	90-100 VDC and 115 VAC Tor-ac Coil Resistances
	ohms (nominal value)
3/CCC-30	904
3.5/CCC-35	869
5/CCC-50	459
5.5/CCC-55	316
8/CCC-80	232

5. Start time on clutches normally should not exceed one second. If excessive, recheck torque rating versus load characteristics.
6. On release springs, check for broken, missing or substituted springs not of our manufacture.
7. Check for oil/grease on friction elements. If this is found, replacement is recommended of complete unit or affected elements.
8. Are control (limit) switches operating properly and set in proper place? A switch malfunction may appear to be loss of torque.
9. Is unit fully burnished? If not, see *Burnishing Instructions*.
10. Check that the restraining bracket is properly secured. See Step 3 of *Installation*.
11. During the life of the unit, friction material and metal dusts accumulate due to normal cycling. This dust may be removed by vacuuming or brushing. Removal of accumulated dusts and dirt will prolong the unit life.

B. Fuse in power supply blows

1. Never put in a higher rating fuse or replace with a slo-blow type.
2. Check resistance of coil, if shorted, replace magnet body and coil assembly. If not shorted, obtain actual coil resistance and compare to reading in Table B, or value obtained from factory.

   Check for grounded lead wire(s) between unit and fuse. If grounded, correct problem. In above, correct problem before installing a new fuse.
3. If cause was not found in Step 2 above:

   a) Check Tor-ac module by removing all loads and replacing fuse. If fuse blows when AC is applied to Tor-ac module, module is defective. Replace.

   b) If cause was not found in Step 2 above, check rectifier bridge by removing all loads and replacing fuse. If fuse blows when AC is applied to rectifier, bridge is shorted. Replace bridge if feasible or discard control and replace.

C. Unit fails to engage

1. See Items under A, this Section.
2. Check armature for free movement of the pins in hub or pulley.
3. Check voltage output from Tor-ac or rectifier control when applying 115 VAC, should be approximately 103 VDC with coil connected. Replace Tor-ac module or rectifier control if it is defective.

TOOL-STEEL HIGH ACCURACY GEAR PUMPS
USER'S GUIDE

Pump #	Identifier	Displacement	Type	# Gears	# Plates	Shaft Seal #
108863	TSHA*	0.160 cc rev.	single	2	3	807729
108864	TSHA*	0.160 cc rev.	dual	4	5	807729
108865	TSHA*	0.297 cc rev.	single	2	3	807729
108866	TSHA*	0.297 cc rev.	dual	4	5	807729
108867	TSHA*	0.584 cc rev.	single	2	3	807729
108868	TSHA*	0.584 cc rev.	dual	4	5	807729
108869	TSHA*	1.168 cc rev.	single	2	3	807729
108870	TSHA*	1.168 cc rev.	dual	4	5	807729
108871	TSHA*	1.752 cc rev.	single	2	3	807729
108872	TSHA*	2.920 cc rev.	single	2	3	807729
108873	TSHA*	4.500 cc rev.	dual	4	5	807729
108874	TSHA*	2.920 cc rev.	dual	4	5	807729
108875	TSHA*	8.500 cc rev.	single	2	3	808680
110290	TSHA*	30.0 cc rev.	single	2	3	808680
110291	TSHA*	45.0 cc rev.	single	2	3	808680

** Tool Steel, High Accuracy*

Customer should read and thoroughly understand this manual before installation and operation of pump.

If necessary, any Dynatec pump requiring maintenance can be returned to the factory for complete repair and overhaul. Please contact our Rebuild Department for further details.

Description

ITW Dynatec's metering gearpumps are manufactured to precise tolerances. To retain their high performance, these pumps must be carefully installed and maintained. These pumps are CE (Declaration of Conformity) rated.

Health & Safety

Dismantling

Internal components are precisely machined and have sharp edges and corners. These features are essential to the accurate metering performance. Particular care must be exercised when handling these components.

Cleaning

Cleaning fluids and methods are subject to strict Health and Safety regulations. Avoid contact with skin, do not inhale fumes and protect eyes.

Operation

Pump outlet pressure and speed limits are dependant on fluid viscosity and throughput. Pump inlet pressure is an important feature for lubrication and fluid homogeneity. Materials for pump construction are important for corrosion and wear resistance. Consult ITW Dynatec for detailed applications. Normally the pumps are single or dual output. Typical speed ranges are 10-90 rev/min.

Flushing

To avoid contamination of process fluid, the pump should be flushed out to remove test oil. Precaution must also be taken to flush out pumps at plant shutdown, since congealed fluid can cause seizure.

Filtration

Unless fluid purity can be guaranteed (especially from metal fragments), filtration must be installed before pump inlet, to avoid damage to pump internals.

Note: The following guide is for general purposes only. Due allowance must be made for any special features.

Installation

Ensure pump is free from protective packing materials and rotates freely.

Pump Drive

Drive alignment is very important. Ensure backlash is 0.1mm (0.004") to avoid shock or radial load. In the event of driveshaft connection, two flexible components must be incorporated into each driveshaft to allow for misalignment. These flexible components must have the capacity to distort over the misalignment range while ensuring that any radial load is minimal. Do not allow

shaft to put end thrust on the pump.

Rotation

Ensure drive rotates in correct direction (generally counter-clockwise at the pump drive spindle). The pump must be checked for smooth operation by hand.

Fixing and Lubrication

The pump must be fixed securely to maintain position and alignment. When secured by lubricated bolts, torque them evenly to the suggested torque (see Maintenance).

Start drive and bring up to speed slowly. Flush with process fluid.

Note: motor baseplate assemblies should be pre-checked in case the drive alignment has been disturbed.

Gland Leakage

If oil seal is fitted, there should not be any fluid leakage.

Problem-finding Chart

Problem	Remedy
LEAKAGE	
Screws not tight	Re-torque
Seal scratched or worn	Replace seal
FLOW RATE ERROR	
Gear worn on diameter or width	Return to ITW Dynatec
Gear teeth damage	Return to ITW Dynatec
Plates worn, scratched or not flat	Return to ITW Dynatec
Low inlet pressure (cavitation)	Check process
High outlet pressure (slippage)	Check process

Cleaning

Before removal from machine, the pump should be rotated for a short period (with inlet supply shut off) to discharge process fluid. Care should be taken, when removing and stripping the pump, to allow for any residual fluid. Pump components can be solvent or ultrasonically cleaned by immersion, using a compartmentalized wire baset. Dry in air. Stubborn residues may be removed with a brass wire brush. Avoid burnishing the sharp edges of gear and gear races.

Fluid immersion in rust inhibitor is advised. If components are to be stored for some time, they should be lightly smeared with oil.

Maintenance

Tightening Torque
for High Tensile ISO 12.9 Lubricated Bolts (300°C max)

Bolt Size & Qty.	Bolt Location	Torque Nm/ Ft.lbs.
M5 (4)	retainer cap	7.1/ 5.2
M10, 12 (4)	mounting bolts	41/ 30 at ambient temperature
M10, 12 (4)	mounting bolts	24/ 18 at production temperature

Notes: If mounting bolts are torqued at production temperature, they should be re-torqued (to 41 Nm/30 Ft lb.) when machine is at ambient temperature.

1 Nm = 8.85 in/lbs. Torques given above are for Metric and UNF threads. Multiply by 0.8 for UNC and BSF threads.Multiply by 0.8 for BSVV threads (multiply by 0.67 for stainless steel)

ITW Dynatec frequently provides special features at their customer's request. Please consult with ITW Dynatec, quoting job and pump references, if questions arise.

Reconditioning

Should reconditioning (overhauling) become necessary, return the pump to ITW Dynatec.

Pump Shaft Seal Replacement

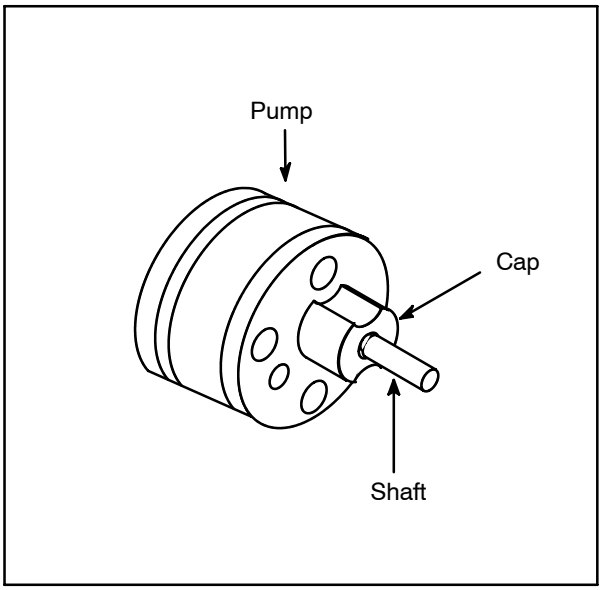
The ITW Part Number for all Standard Tool Steel High Accuracy Pump Shaft Seals (8.5cc and smaller) is PN 807729.

DANGER HOT SURFACE & HIGH VOLTAGE

If the pump is not operable but the heating system will function, raise the temperature of the application system to the operating temperature to aid in the pump disassembly process. Otherwise, a heat gun or other controlled heating method is recommended to melt hardened hot melt material. Never use a torch or an open flame on any of the components of the application system. Once the system is up to temperature, disconnect all incoming power before proceeding.

Pump Shaft Seal (O-ring) Replacement:

In most cases, the pump does not have to be removed from the ASU in order to replace the shaft seal.



1. Disconnect the drive coupling so that the pump may be accessed.

2. Remove the four screws in the pump “cap” and remove the cap.

3. Within the cap is the pump shaft seal. Remove the old seal.

4. Clean all pump parts, paying particular attention to the pump shaft seal groove.

5. Lightly lubricate the shaft seal before inserting it in the shaft seal groove.

6. Before re-assembling, wrap a small piece of paper around the shaft so that the shaft’s woodruff key seat does not damage the new seal.

7. Re-assemble. Remove paper.

8. Re-tighten four screws.

9. Re-connect drive coupling.

10. Return ASU to operation and check pump for leaks.

Rebuild Kit for 8.5cc TSHA Pump, PN 111939

The rebuild kit for the PN 108875 8.5cc TSHA pump consists of the following parts:

PN	Description	Qty.	PN	Description	Qty.
111699	Drive Shaft	1	111707	Retaining Ring	1
111699	Idler Shaft	1	111709	Screw, 10-24	4
111701	Bushing, Front Plate	1	807729	Pump Shaft Seal	1
111702	Bushing, Back Plate	1	111705	Key	1
111704	Dowel	2	078I001	Key, Woodruff	1